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ARCHITECTURE

ENGINEERING

DECORATION

CONSTRUCTION

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House for A. J. Drexel, Esq., Lansdown, Pa.
House for J. De F. Junkin, West Philadelphia, Pa.
Competitive Design for Church Clergy House, etc., New York.

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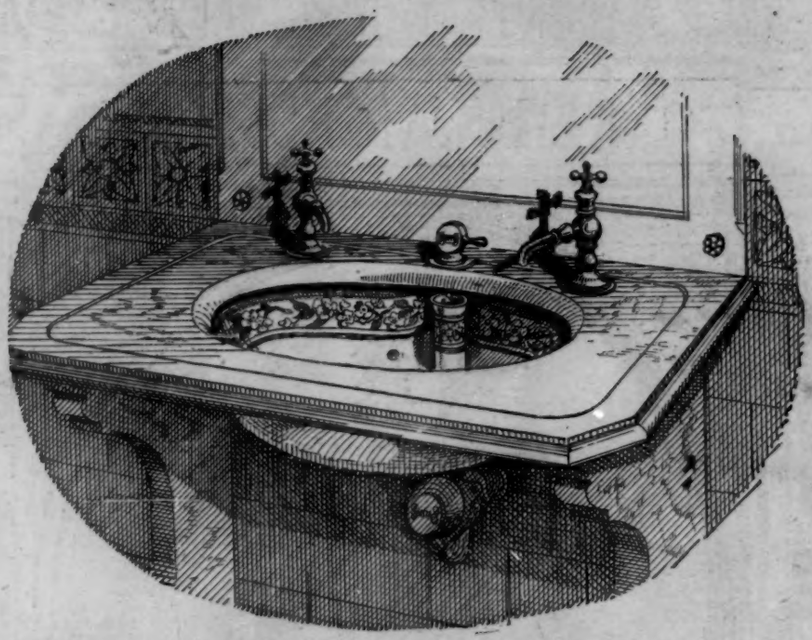

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SOME of the rooms in the new Public Library in Boston are being covered with a sort of vaulting which, so far as we know, has been used in this country only in this building, and in some about New York. The vaulting is constructed with thin, flat tiles, about one inch thick, six inches wide and a foot long. These are laid in three or four courses, according to the span and the weight to be sustained, with Portland cement between. At the Library, the rooms already covered are about twelve or fourteen feet wide, and the vault is, in most cases, of a nondescript order, forming a portion of the surface of a ring of circular section. This shape is given to it for convenience in construction. A skew-back, or rather, a formeret, is made on one wall by means of three or four courses of tiles built-in in the form of a circular arc. Another skew-back, in the form of another circular arc, is then formed on the walls at right angles with the first. These skew-backs spring from the same point, in the corner of the room, as the first, but the radius of their curve need not be the same, and in the oblong rooms is generally longer, so as to make the rise the same, with a longer span. The mason then begins at the first skew-back, using a light centre, which he can carry in his hand, formed to the same radius as the skew-back from which he starts, and lays a row of tiles on the centre, the ends of which he supports on the side skew-backs. The edges of the tiles are jointed with plaster-of-Paris, which sets immediately, so that by the time the ring of tiles is finished, the centre can be taken out and moved along on the side skew-backs for setting another row of tiles. In this way a sort of dome is formed, of rings of tiles, all of the same radius, but rising from all sides to the centre. As the dome approaches the remaining side, a fourth skew-back is formed on that side to rest it on. As soon as the first shell is completed, it forms a platform capable of bearing the weight of the men, and the subsequent courses of tiles are laid by hand directly upon it, taking care to break the joints. All the subsequent work is laid in Portland cement, the plaster-of-Paris being used in the first course only to hasten the hardening so that it can be worked on. In the case of large rooms at the Library, where piers occur in the middle of the rooms, they are used to carry arches, also of three or four rows of tiles, on which the domes rest as on skewbacks. The appearance of the tile domes is very monumental, even without any plastering or decoration, but of course they can be finished as required. So far as strength is concerned, the new method of vaulting appears to surpass a construction of iron beams and terra-cotta arches, as usually put in. A heavy load has been put on one of the arches at the Library, and after the cement has had time for setting, the load is to be increased until the structure breaks down. Whether the thrust is greater than that of the brick or terra-cotta arches between iron beams seems to be uncertain. The Portland cement unites the tiles into a solid mass, like an eggshell, and it was found at the Boston Library that no deflection was caused by the heavy load placed upon it, showing pretty conclusively that it acted as a shell, and not as a proper dome. The cost of the new construction is about the same as that of iron beams and brick or terra-cotta arches over the same span, supposing that to be moderate. For many purposes the appearance would be better, although it takes much more height, counting the distance from the springing to the crown. The weak point, as it seemed to us, is in the cross arches, between the piers, on which two domes descend from opposite sides. The three or four rows of tiles which form these arches, if they constitute a real arch, give a very thin one, which an irregularity of loading might, one would think, easily distort beyond the limits of safety. If they do not form an arch, but a curved lintel, the thickness appears too small to sustain safely the strain which would be brought upon it by anything like a heavy load on the two vaults which it has to support. This, however, is a matter which can be determined better by tests than by theorizing, and it is to be hoped that the trials which the Trustees of the Boston Library propose to make will cover all these points, and that the results of them may be published for the benefit of the building public.

AN architect's suit was recently decided in the Supreme Court of Massachusetts, which has a certain interest. The architect of the Adams House, a well-known hotel in Boston, sued the owner for something over twenty-five thousand dollars, for services in preparing plans and superintending the construction of the building. The defendants claimed that the architect agreed to render the necessary services for three and one-half per cent on the cost of the building. This was four hundred and fourteen thousand dollars, so that his commission amounted to fourteen thousand dollars, of which they had paid him eight thousand dollars, and were ready to pay the balance. The architect admitted the agreement to accept three and one-half per cent commission, but claimed additional compensation for extra services and for superintendence. Evidence was brought as to the skill and reputation of the architect, and the auditor who first heard the case awarded him about eighty-five hundred dollars. The case was tried again before a jury, which brought in a verdict for thirteen thousand dollars for the architect. This, added to the eight thousand dollars previously paid on account, is about five per cent on the total cost of the building, so that the jury seems to have taken the view that five per cent on the cost is about what the architect ought to have for such work, and that if he was foolish enough not to come to a clear understanding in the first place with his clients, about what he was to do and what he was to be paid for doing it, he deserved to lose the comparatively small compensation which he might have earned by extra work.

THE city of Toronto is having a little experience with building contracts which is likely to be valuable to it hereafter. It seems, so far as we can gather from the Toronto *Globe*, that a firm of contractors agreed to furnish the city with paving-blocks of "first-growth cedar, free from pin-holes." They furnished the blocks, but some one happened to examine them and found that they were not "free from pin-holes," and the inspector on the work gave notice to the contractors that no more blocks not in strict accordance with the specification would be received. The contractors appealed from him to the Chairman of the Board of Public Works, saying that all first-growth cedar had pin-holes in it, and that it would be as reasonable to expect them to find trees without bark as timber of the kind specified without them. The chairman gave them no comfort, but announced his intention of supporting the inspector, and the contractors, after a little consideration, resolved to "throw up the contract," and, accordingly, took six hundred men and nearly two hundred teams away from the work, leaving them to idleness. If the contractors expect to coerce the city authorities by this expedient to accept materials of a different quality from those contracted for, we hope they will be disappointed. If the specifications called for materials which could not be furnished, the time to find it out and speak about it was before the contract was signed, and representations

of the kind should not now be listened to for a moment. Still less should the city allow itself to be threatened or bullied by men whom its officers are simply trying to compel to live up to their own promises. If the contract contains, as of course it ought, provision for having the work completed by other parties at the expense of the contractor in case the latter neglects his duty, and if the engineer in charge has been careful to guard the city's interest by keeping back a good reserve of payments, a good lesson can be easily and quickly taught those who wish to have dealings with the municipal authority. Of course, we do not advocate anything like oppression, but the high-handed practice which is so popular among contractors for public work of "throwing up" their contracts at the least provocation, and turning a lot of hungry voters into the streets to terrify the politicians, needs repression to be rebuked. If a contractor has in good faith undertaken to do what is impossible, his best and most natural course is not to try to terrify the other party to the contract into accepting something else in place of what he agreed to do, but to go to him, or the expert who has charge of his interests, and explain the situation frankly, asking for such relief as can be fairly granted. Very few architects or engineers would advise their clients to take advantage of an innocent mistake, or to insist upon impossibilities merely for the sake of distressing a person who had inadvertently entered into an embarrassing agreement; but no architect or engineer would fail to instruct his clients that in such a case they were entitled to insist upon the letter of the agreement, and that any concession they chose to make would be simply a favor on their part. However it may be with private individuals, municipalities are usually very willing to do justice in such cases, and to pay fairly for work and materials honestly and faithfully rendered, even though the contract provides only an inadequate price, and it would have been much better for the Toronto contractors to have appealed to the public sense of justice for subsequent reimbursement, if the fulfilment of their promises involved them in loss, than to have plunged at once into a struggle in which not only the law, but the general sense of what is courteous and fair, will be against them.

SO many architects carry accident-insurance policies, that the following case, which was decided in France the other day, has a certain interest. A man held an accident-policy, in which it was stipulated that accidents proceeding "from infractions of the laws and public regulations" should not be covered by the policy. The holder of the policy, being in a railway station, crossed the tracks to reach a train, although he was warned not to do so by the station-agent. While he was crossing a locomotive struck him, and he died from the effect of the blow. The accident-insurance company refused to pay the indemnity, on the ground that death was caused by infraction of the public regulations, and the widow sued to recover the money. The court decreed in her favor, on the ground that the warning of the station-agent was an official act as servant of the railway company only, and could not be extended to serve, in a contract of insurance, as the act of a public officer. Lest, however, any reader should be tempted to risk his life, as well as his insurance, by crossing tracks in front of trains in this country, it should be remembered that American accident-policies often provide expressly that the insurance shall not cover accidents arising from crossing railroad tracks or walking on them; and in some of our States, if we are not mistaken, the act of walking on a railroad track is itself made a misdemeanor, so that insurance could not, under the ordinary accident-policies, be collected for mishaps due to this violation of law.

THE Rotch Scholarship for the present year has been awarded to Mr. Henry Bacon, Jr., of Boston, one of the best-known draughtsmen of the city. As usual, the number of competitors was very small, only three or four having, we believe, applied for the preliminary examination. Fortunately for the reputation of Massachusetts architects, the quality of the candidates has been uniformly good, but it is astonishing that so great a prize, the realization of the dearest dream of most ambitious young architects, should not be pursued by them more eagerly. To say nothing of the pleasures of a two years' sojourn abroad to a young architect, the advantage to his future career, not only of the study in which he would occupy his time, but the reputation which the winner of so renowned a scholarship gains, is almost incalculable. We are so little accustomed to artificial distinctions among men that it hardly occurs to us that the winner of a great professional prize in this country, quite as much as in any other, has his future practically assured. If he is even moderately possessed of prudence and common-sense, employers and clients will come to him, in preference to others, simply because they have heard his name in connection with a professional distinction which could not have been gained without professional merit, and it will be his own fault if the connection so easily and happily formed is not indefinitely enlarged and perpetuated.

THE Massachusetts Charitable Mechanic Association seems to have seen an opportunity for taking the wind out of the sails of the younger body, the Association of Master Builders, by putting itself at the head of a movement for the establishment of trade schools in Boston. It is well known that Colonel Auchmuty has recently made an offer to the Master Builders' Association, or certain members of it, proposing to contribute a large sum every year for three years toward the support of such schools. Whether this association has made any answer to the offer we do not know, but the Charitable Mechanic Association, by appointing a commitee to consider the subject of the establishment of such a school "either alone or in conjunction with other parties," appears to have an eye out for such help. However that may be, it has appointed a very good committee, and whether the Charitable Association or the Master Builders carry the matter through, it is sure to be well done.

THE Government of India offers a prize of one thousand rupees, about three hundred dollars, for the best text-book on "Hygiene and Domestic Economy," adapted to the use of senior and advanced pupils in the English and Anglo-Vernacular schools. The book should treat of the subjects mentioned in the Sanitary Primer called "*The Way to Health*," and should not comprise more than one hundred and fifty pages. Manuscripts must be sent to the Home Office, Simla, and must be received before the first of September next, and the successful one is to become the property of the Government.

THE City of Paris has opened a competition for the decoration of some of the remaining rooms in the new Hôtel de Ville. Only French artists are admitted to the competition. One of the rooms to be decorated is a reception-room in a certain corner, and the sum of eighteen thousand dollars has been appropriated to the work. The other room is the vaulted gallery known as the Galerie Lobau, and twenty-four thousand dollars is to be paid for its decoration. The subjects and treatment for the Galerie Lobau are left absolutely to the discretion of the artist, but the subject to be represented in the reception-room must be the siege of Paris.

IT seems that the pneumatic gun invented by Lieutenant Zalinski is becoming very popular as a destructive agent. Already the company formed to manufacture the guns has received orders from the Italian, Spanish and Egyptian Governments, but the greatest compliment of all has been received from the German Government, which is said to have constructed a gun of its own on Lieutenant Zalinski's model, twelve inches bore and seventy-four feet long, which it has been experimenting with at Kiel. A projectile of bronze, six feet long, and weighing about two hundred pounds, was used in the experiments, with a charge of explosive gelatine which may be carried up to six hundred pounds if desired, although not more than seventy-five pounds was employed in the trials at Kiel. With this charge a ship, anchored a mile and a quarter away, was completely destroyed with two shots. The first shell fired at the vessel struck the water a little distance from it and exploded under water, injuring the target seriously. The second struck it fairly in the middle, completely destroying it. From this account it would seem that either the practice of the German artillerymen must be very superior, or their new gun must have been made and bored very accurately and stiffened in some way. In the earlier Zalinski guns the spring of the long, light barrel interfered with the accuracy of the fire, and if a gun nearly one-fourth longer than these had been made to deliver its projectile with so much greater steadiness and accuracy, the improvement will be worth copying.

BUILDERS' HARDWARE.[1] — XXV.

DOOR-KNOBS.

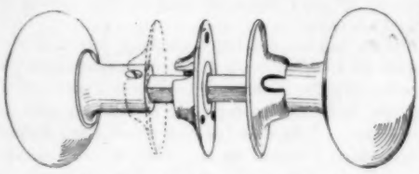


Fig. 366. Knob with Spindle-screw partly covered.

THE ordinary appliance for operating a door-latch consists of a knob on each side of the door, made of porcelain, wood, composition, or metal in various forms, but generally in the shape of a flattened sphere. The knobs are attached to metal shanks serving to hold them away from the door, and to prevent their pushing in, and the two knobs are connected through the lock by a square spindle. The spindle is firmly attached to the shank of one knob, and on the other side of the door it fits loosely in the shank, considerable length being allowed for the adjustment to various thicknesses of doors, the inner knob being finally secured in place by a screw on one side of the shank which passes entirely through the spindle, and sometimes is also made of sufficient length to turn into the opposite side of the shank. The hole in the door through which the spindle passes is covered by a metal disk technically designated as a rose. The rose is secured to the door by screws, and as the shank of the knobs is made to fit closely against the rose, if well put on there will be no strain on the lock when the knob is pulled from the opposite side, all strain being gathered on the rose itself. Knobs are usually provided with a number of small washers, so that the adjustment between the bearing-surfaces of the roses and the ends of the shanks can be made exact, and thus any rattling be obviated. In many instances the shanks are secured to the spindle with screws on each side of the door, so that the knob can be taken off from either side of the door. For front-door and vestibule work the outer knob should always be securely attached to the spindle, so that no screw is necessary, as otherwise, if the shank is held by a screw it can be removed from the outside of the door, the spindle pushed in and the inner latch follow turned back. For interior work, however, it makes little difference whether screws are used on one or both sides, though many consider the use of screws as altogether objectionable, owing to their liability to work loose; and, aside from any questions of design, the ingenuity of hardware manufacturers has been chiefly expended upon securing a better connection between the knob and the spindle. Still, few of the patented forms of attachment have been very generally received, and the old style of screw attachment seems to meet with the most favor, if we may judge by usage. It is not the question of cost alone which has decided this in the minds of many builders and architects, but rather a belief that a tangible fastening like a screw which is easily placed and easily removed, is, after all, more satisfactory than any concealed device.

The objections to the old style of fastening are, however, easily appreciated. One trouble is that the spindle will work and wear away so as to be loose in the follow, and rattle every time the knob is touched. This is particularly noticeable in very old work, in which the parts are sometimes so worn as to admit of as much as half an inch play at the end of the knob. In new work, the spindle, the follow and the roses can be fitted so that any rattling is impossible, though with the old styles of fastenings this is accomplished only by the best manufacturers.

With the old style, the screws are apt to work loose, as applied by ordinary mechanics. In cheap work they nearly always do so; still, if proper care is taken and the screws turned up with a drop of thick shellac in the threads there will be little trouble, and none that cannot easily be remedied with a screwdriver.

There are other objections of less moment, such as the fact that considerable time is occupied in fitting the washers necessary to a proper adjustment of the spindle and shank; and the proper attachment of the screws takes time also. It is further found that when the spindle and shank wear away there is apt to be a strain brought upon the lock-plate through the door, thereby endangering the proper action of the levers. We have said, however, that these objections are by no means vital, and are such as might be due to careless or indifferent workmanship. One of the best evidences that the old style is the most satisfactory, is that every manufacturer has it on his catalogue-list. Anything else is really an exception, and we know of only one instance in which a manufacturer has undertaken to push exclusively a single form of knob attachment differing from the common style. It must not be thought, however, that no clever or good devices have been thought out. It is hard to simplify simplicity, and the screw connection, all things considered, gives eminent satisfaction.

The first variation from the old style has been to enlarge the rose, extending it out over the shank so as to partially or completely cover the screw-hole, a slot being left at each side through which the screw can be applied, the rose subsequently being turned and secured against the door so as to completely cover the screw. Figure 366 shows such a form. This device renders it absolutely impossible for the screw to become detached, though it does not prevent it from being a little loose, and so permitting the knob to rattle; and as the difficulties of getting at the screw are increased by this method, the probabilities are that most people would let the knob rattle instead of taking the trouble to tighten the screw. Still, this is an improvement, and when well applied is very satisfactory. The next step has been to cover the screw entirely. Figure 367 shows one mode in which this has been accomplished. The rose is made in two portions, one consisting of a flat piece resting against the door, and serving as a bearing-plate for the shank, while the other portion of the rose which would show in the finished work consists of a thin shell curved out so as to entirely cover the screw. The screws which hold the rose to the door pass through both the outer shell and the inner plate.

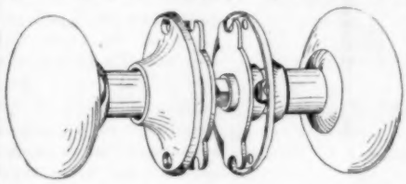


Fig. 367. Knob and Spindle-screws covered. Russell & Erwin Mfg. Co.

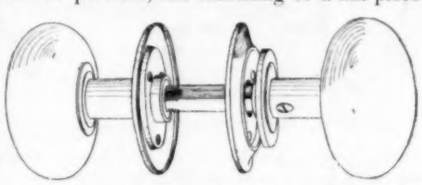


Fig. 368. Knob with threaded Spindle. Stoddard Lock Mfg. Co.

Figure 368 shows another form in which one screw is done away with. The spindle is cut with screw-threads. The rose is made in two portions, one being screwed to the door, and the other acting as a binding-screw or washer, screwing onto the threads of the spindle at the same time that the shank of the knob screws behind it, the two locking, and preventing the knob from being unturned except by forcible means. As the spindle is held in the latch, the knob can, of course, be turned but half way in either direction.

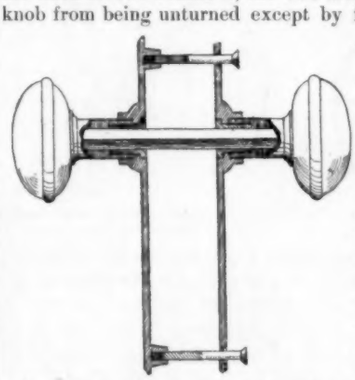


Fig. 369. Screwless Door-knob and Escutcheon combined. P. & F. Corbin.

Another form of knob substitutes a continuous ratchet on one face of the spindle for the screw-holes of the common form. These knobs are made by the Boston Knob Company, and outwardly appear like an ordinary knob. The advantage is that the knob can be adjusted at any point without the aid of washer, the screw catching onto the ratchet in any position of the shank.

Figure 369 shows a form which does away with the screws entirely. The key escutcheon and the rose are combined in a single plate on each side of the door. Inside of the rose is a hub which is cut with a screw-thread. The spindle passes through this and into the shank of the knob, which is cut with a thread corresponding with the thread on the hub. In applying this fixture the knobs are simply screwed on until

[1] Continued from No. 686, page 197.

they bear slightly on the edges of the rose. The escutcheon-plates are then screwed together through the door as shown on the drawing. As the spindle passes through the latch it will readily be seen that the knob cannot be unscrewed except by removing the escutcheon-plates, and as these plates bear on each side of the door above and below the lock, it is almost impossible to bring any strain on the lock-plate itself.

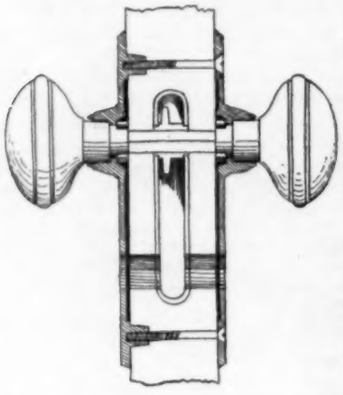


Fig. 370. Screwless Door-knob and Escutcheon combined. Russell & Erwin.

Figure 370 is a somewhat similar form as regards the escutcheon-plates. The knob, however, is attached by means of lugs on the shank, which in one position of the knob will slip into the hole in the rose; but when half turned will catch on the inner side of the plate, thus rendering it impossible for the knob to be removed except by unscrewing the face-plates from the door. Figure 371 is a device practically the same as that shown by Figure 368. Figure 372 is still another variety

Fig. 371. Mathes's Adjustable Screwless Door-knob. Nimick & Brittan.

of the same general style of attachment, using a steel binding-screw to hold the knob-shank in position.

The Yale & Towne Manufacturing Company has recently put on the market a form of screwless knob-shank shown by Figure 373. In this case the spindle is turned round at each end and threaded. The knob is provided with a swivel-nut, *D*, which fits the thread of the spindle. In applying, the nut is turned up until it bears slightly against the face of the

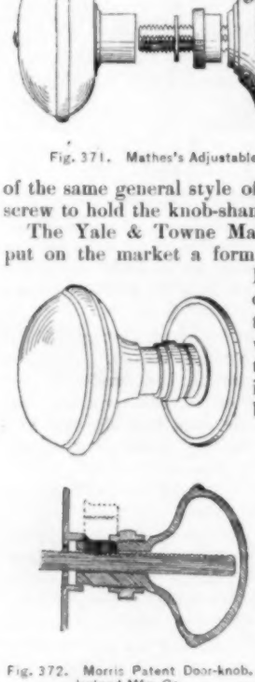


Fig. 372. Morris Patent Door-knob. Ireland Mfg. Co.

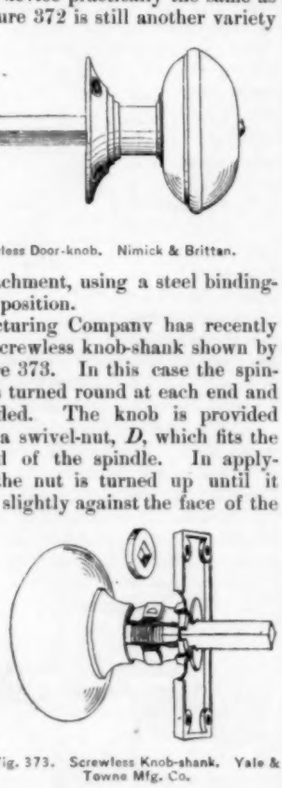


Fig. 373. Screwless Knob-shank. Yale & Towne Mfg. Co.

rose, and is then left in that position, a washer being interposed between the rose and the nut. The nut takes the place of the ordinary shank, and as this portion of the knob is seldom touched, there is little liability of the nut working loose, especially as it can be turned up pretty tight, and is made so as not to work too easily.

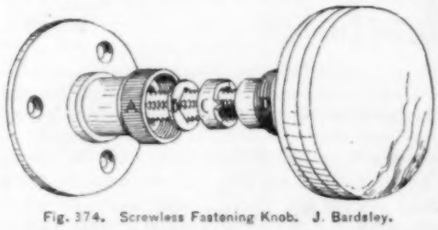


Fig. 374. Screwless Fastening Knob. J. Bardsley.

Figure 374 represents still another variety of screwless knob-fastening. The nut, *C*, forces the washer, *B*, against a shoulder inside of the shank, *A*, binding the latter firmly to the rose and to the door. The knob is then slipped over the spindle, and the shank, *A*, screwed over the shank, *D*, until the knob is drawn up tightly. The only chance of the fastening working loose is by accidental turning of the shank, *A*, which is not likely to occur.

The Yale & Towne Manufacturing Company has a device illustrated by Figure 375 which is on a very different principle from any of the foregoing, as it does not depend upon screws of any kind. In this case the knob-shank is cut out with an eccentric socket or bore. The ends of the spindle are turned down to exactly the same contour as the bore of the shank; so that while the knobs on either side of the door can easily be slipped over the ends of the spindle, they can be fastened by simply rotating them in opposite directions, when the fine pitch of grade of the eccentrics causes a great pressure to be exerted, which results in binding the knobs rigidly to the spindle. This is the simplest form of knob attachment in the market, and if properly applied, will always remain in order, though great care must be taken that the knobs are turned up firmly.

For front-door locks and latches it is necessary to have some form of spindle in which the two extremities may be worked independently, so that the outer knob may be locked while the inner one is free to rotate. The commonest form is to connect the two halves of the spindle by a swivel joint, Figure 376. Corbin has in the market a spindle in which the two halves screw together, thus permitting of very careful adjustment to the thickness of the door. The pitch of the screw-threads is so slight that the quarter turn necessary to open the latch does not throw out the knob from the door.

Fig. 375. Screwless Spindle and Socket. Yale & Towne Mfg. Co.

Fig. 376. Swivel Spindle.

There are various methods of attaching the head of the knob itself to the shank. When porcelain or mineral composition is used, the shank is leaded into the knob. Hemacite, zylonite, etc., are cemented or screwed to the shank, as are the cheaper forms of wooden knobs. Metal knobs are blind riveted, cast solid to the shank, or shrunk on. Glass knobs are commonly leaded, but in some cheaper forms are cemented or even puttied.

There are, however, some devices which are intended to attach the knob more firmly to the shank. Figure 377 is one which is used in connection with wooden knobs. The shank is cut with a screw-thread which turns into a corresponding

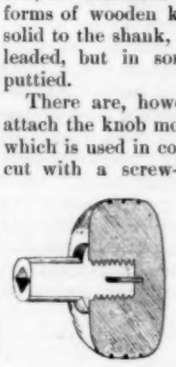


Fig. 377. Knob Fastener. J. Bardsley.

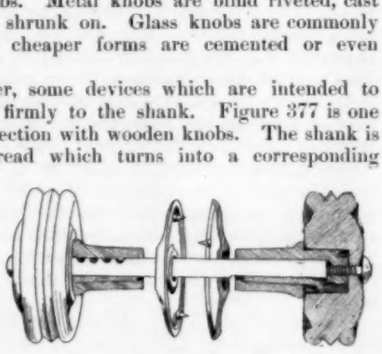


Fig. 378. Phipps's Patent Door-knob. Milford Door-knob Co.

thread cut into the knob. Before the shank is screwed in, a metal key extending through the shank is placed in the slot, and after the knob is firmly screwed on the key is forced into the wood by means of a punch placed in the opening of the shank, the key thus effectually locking the shank into the knob.

Figure 378 shows a form of attachment for either wood or metal. In this case the knob is held by a screw passing from the knob through the upper portion of the shank and into the head of the spindle. The spindle can be adjusted for any thickness of door by means of a small wedge which can be driven in before the knob is attached, in such a manner as to hold the shank at any given position.

[To be continued.]

Long Span of a Silicon-Bronze Wire.—A wire belonging to an English telephone company, which crosses the entrance to Dartmouth Harbor, has the remarkable span of nearly half a mile, *viz.*, 800 yards. On leaving the Dartmouth side the wire is 332 feet above high-water mark. It drops to 198 feet near the Kingswear side, and then rises again to 207 feet. The wire is very fine and light, being of No. 17 silicon-bronze, weighing twenty-four pounds to the span.—*Exchange.*

ARCHITECTURAL SHADES AND SHADOWS.[1] — IV.

CHAPTER IV.— LINES AND PLANE FIGURES.

Principal planes, lines and diagonals, and their projections and traces; shadows of points on either plane of projection; shadows of lines and figures parallel to a plane of projection and of principal lines in general.

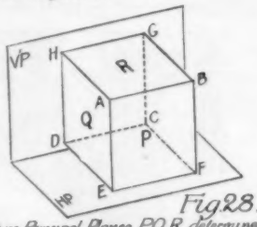


Fig. 28.

Three Principal Planes P, Q, R, determined by any three intersecting Principal Lines, as AB, AH, AE. Such lines are themselves intersections of Principal Planes.

35. If we suppose a cube or rectangular prism to stand with its faces respectively parallel and perpendicular to the planes of projection, its six faces and six edges will form what are called *principal* planes and lines. Such planes are parallel to $V'P$ and perpendicular to HP; parallel to HP, and, consequently, perpendicular to $V'P$; or perpendicular to both planes of projection and to GL. Principal lines are, similarly, vertical lines, horizontal lines normal to $V'P$, and horizontal lines parallel to both planes of projection and to GL. They are illustrated by Figures 28 and 29. Principal lines are formed by the intersections of principal planes, and any two such lines intersecting determine a principal plane.

36. Lines parallel to the diagonals of the faces of a cube placed as above may be classed as *principal diagonals*. They lie in principal planes at an angle of 45° to one or the other plane of projection (as AF, BE, AG, HB, Figure 30) or to both planes (AD, HE). Their projections are shown in Figure 31, and they will be generally designated by the lettering used there and in Figure 30. A third set of lines should be noticed, parallel to the diagonals of the same cube; inclined, that is, at 35° 15′ to the planes of projection, and represented in projection by lines in all cases at 45° to GL, as shown in Figure 32. The planes passing through opposite edges of the cube and bisecting it may be called *principal diagonal planes*, each containing two cube-diagonals, and having for one trace a line at 45° to GL, and for the other a line normal to GL, or else having both traces parallel to GL (Figure 33). The shadows of these various lines and of figures in these planes, being those most common in architectural drawing, should be thoroughly mastered, and to these our investigations will now be directed.

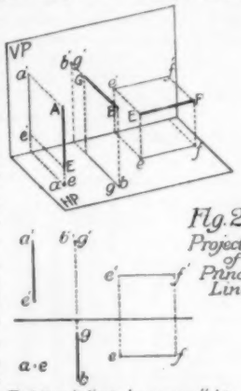


Fig. 29.

Projections of Principal Lines.

The letters indicate lines parallel to those in Figure 28 similarly lettered.

37. As a large proportion of the shadows in architectural drawings fall upon vertical or horizontal planes parallel to HP and $V'P$, and the picture-plane or plane of projection may be assumed so as to coincide with such a plane (the trace of the latter forming the ground-line), it will simplify matters to consider the shadows in the following rules as falling upon the plane of projection itself, thus avoiding the constant repetition of the words, "or upon a plane parallel to the plane of projection."

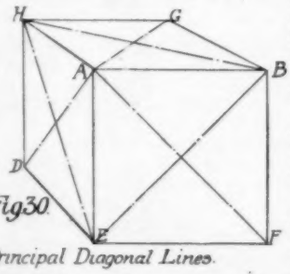


Fig. 30.

Principal Diagonal Lines.

38. If a point O be given by its projections, o, o' (Figure 34), its shadow on $V'P$ (for example) is found by drawing both projections of a ray passing through the point. The horizontal projection of this ray intersects GL at o_1, which is the horizontal projection of the required shadow, whose vertical projection will, consequently, be at o'_1 on the vertical projection of the ray. In the same way its shadow on HP may be found, remembering that it may fall behind $V'P$ (*i.e.*, above GL) quite as often as in front of it, in which case care must be taken not to confound it with projections on $V'P$. o'_2 is the vertical and o_2 the horizontal projection of the shadow of oo' on HP in Figure 34.

[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College. Continued from page 176, No. 694.

NOTE. — [In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

HP = horizontal plane of projection; $V'P$ = vertical plane of projection; GL = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow: small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multiplied by $\sqrt{2}$.

Hence this rule:

(*I*) *The projection of the shadow of a point O, cast upon a plane of projection, is found upon a line drawn at 45° to GL through the projection of O. Its distance from the latter, measured horizontally or vertically, equals that of O from the plane of incidence.*

Hereafter, for the sake of avoiding tedious repetition, points, lines and shadows will be distinguished from their projections by prefixing the word "real" or "actual," omitting the words "projections of" wherever it can be done without obscuring the sense.

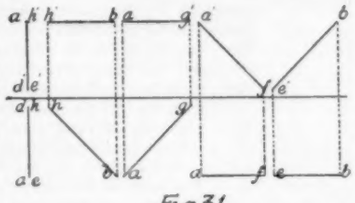


Fig. 31.

Projections of Principal Diagonal Lines. The letters correspond to those of Fig. 28 and 30.

39. The shadow of any right line is determined by the shadows of its extreme points (*a*, Figure 35). When only the direction of its shadow is required, the shadows of any two of its points will suffice (*b*).

40. It is easily seen from the rule in 38 that the shadow upon a plane of projection cast by a right line parallel to it must be equal and parallel to the line, since all the points of the latter are equidistant from the plane. Hence the shadow of a single point of such a line suffices to determine its shadow, as in Figure 36, where the shadow of the line is drawn through that of its point, $a\,a'$, parallel to the line itself, and its two segments, a', c', and a', b', laid off equal to $a'\,c'$, $a'\,b'$.

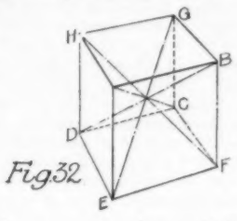
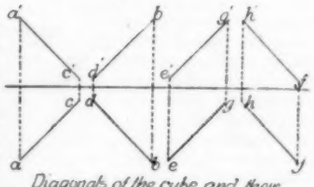


Fig. 32.

This is equally true of plane figures parallel to the plane of projection, since they may be considered as made up of infinitesmal straight lines (Figure 37). The shadow of one point of such a figure suffices to determine the shadow of the figure.



Diagonals of the cube and their projections.

41. And finally, since any plane figure and its shadow on any plane parallel to itself are really parallel sections of its shadow in space, these sections are equal. Whence this general rule:

(*II*) *When a plane figure casts its shadow on any plane parallel to itself, this shadow is both equal and parallel to the figure, and its projections are equal and parallel to the projections of the figure.*

42. Applications of Rules (I) and (II) may be found in Plate II. In No. 8, for example, the difference between a' and its shadow a'_2, measured horizontally, is $a'o'$, and vertically $o'a'_2$, each of which is equal to the distance of the point $a\,a'$ from the plane of incidence. In the same way, the horizontal and vertical distances of b' from b'_1 are each equal to that of the edge of the coping from the face of the projecting pilaster. In No. 11 the shadows of a', b' and c' are found by laying off horizontally and vertically the distances of a', b' and c' from the plane of incidence, which distances can in many cases be ascertained without drawing a plan. So, also, the shadows of the horizontal and of the raking corona are found by means of the shadow of a single point in each, these shadows being parallel to the corona in each case. In Nos. 2, 3, 4, 6 and 7 the shadows of the horizontal and vertical edges parallel to $V'P$ are at once drawn parallel to those edges, and limited by the shadows of their extreme points. In No. 5 the vertical right-hand edge of the parapet casts vertical shadows on the risers of the stairs in elevation, their width in each case being equal to its distance from the riser; while in the plan its upper horizontal edge casts parallel horizontal shadows on the treads as wide as its own height above each tread. This is made clearer by the perspective sketch, Figure 38. From all these examples the corollary is evident that the *width of the shadow upon a vertical plane, of any horizontal or vertical member parallel to it, is equal to the overhang or projection of the line or edge casting the shadow.* This gives a simple rule applying to a multitude of cases: the jambs and lintels of doors and windows; the lower edges of window-sills, coronas of cornices

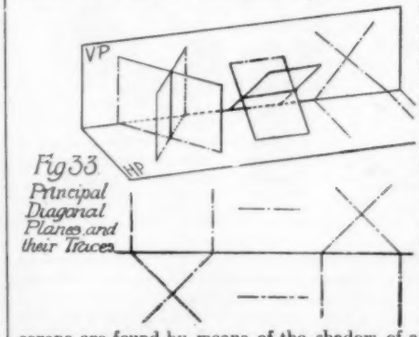
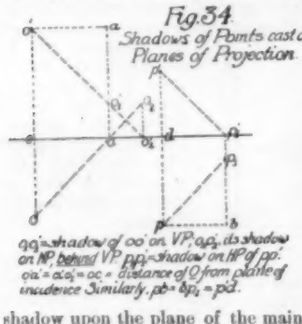


Fig. 33.

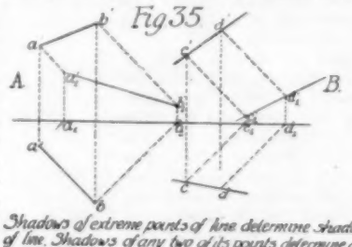
Principal Diagonal Planes and their Traces.

and string-courses; horizontal and vertical mouldings; the edges of piers, pilasters and projecting rectangular masses of building, and many others. Nos. 10 and 11 contain several examples of its application, while No. 9 illustrates the shadows of arches upon vertical planes drawn by means of the shadows of their centres (Figure 37). The plane of each stepping of the arch is supposed to be extended across the opening so as to receive the shadow of the centre of the arch next in front, as shown by the dotted lines in the plan. Having thereby found the vertical projections of the shadow of the centre, the shadow of the arch is then drawn from this new shadow-centre with a radius equal to that of the arch. Thus c'_1 is the shadow upon the plane of the main wall of the centre of the archivolt, whose radius is then used to describe its shadow from c'_1; c'^1 is the shadow-centre from which the shadow of the first arch upon the plane of a second is drawn, and so on.



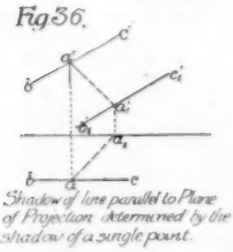
qq'=shadow of oo' on VP, qq'₁ its shadow on HP, behind VP. pp'₁=shadow on HP of pp'. oa'=ac'₁=oc'=distance of O from plane of incidence. Similarly, pb'=bp'₁=p'd'.

43. A line perpendicular to a plane of projection has for its shadow a line inclined at 45° to $G\,L$,[1] parallel to the projection of a ray of light. For the projection upon either plane of a line perpendicular to it is a point (note to Chapter II, 4), which we will call p'. Since p' is the projection on that plane of the whole line, it is the projection of every point in that line; consequently, a line drawn through p' at 45° to $G\,L$ must contain the shadow of every point in the given line (Rule I). But this will be true whatever the nature of the surface of incidence, so that the shadows of the various points of such a line, even when they fall upon an irregular surface, must still be in the line drawn through p' at 45° to $G\,L$. This is further evident if we consider that the invisible shadow of the line in question is a plane perpendicular to the plane of projection, and contains the cast shadow of the line (22, Maxim VIII, *b*), which is, therefore, projected as a right line; for whatever the real form of the cast shadow, it lies in this plane of invisible shadow, and, as this plane is seen edgewise, every line in it will appear straight, although in perspective its irregular form becomes evident, as appears by comparing Figure 38 with No. 5, Plate II, and Figure 39 (note to Chapter II, 6, and Figure 37).

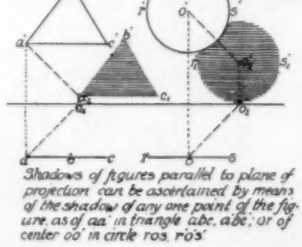


Shadows of extreme points of line determine shadow of line. Shadows of any two of its points determine direction of its own shadow.

The *length of the shadow* of such a line falling on the plane of projection or upon a plane parallel to it is equal to the *diagonal of the line itself*. This is easily deduced from 38 and from inspection of the geometrical relations of the shadow itself. The various facts we have considered may be stated thus in the form of a rule:



Shadow of line parallel to Plane of Projection determined by the shadow of a single point.



Shadows of figures parallel to plane of projection can be ascertained by means of the shadow of any one point of the figure, as of aa' in triangle abc, abc; or of center oo' in circle ros, ro's'.

44. (III). *The shadow of a line perpendicular to a plane of projection is a right line at 45° to the horizon, regardless of the form of the surface upon which it falls. Upon a plane parallel to the plane of projection its length is equal to the diagonal of the line casting it.*

This rule has very frequent applications in architectural drawing, some of which are shown in Plate II. In No. 1 the right-hand upper edge of the abacus casts its shadow on the wall, while that of the lower left-hand edge falls across the echinus, fillet and necking (crossing several other shades and shadows); both are alike lines at 45° to $G\,L$. In No. 10, the shadow of the horizontal flagstaff seen as a mere point over the window in the wing, and the shadow of the right-hand cornice of that wing running back to the main body of the building, are both drawn at 45° to $G\,L$, though they cross a variety of surfaces, mouldings, pilasters, windows, etc. In No. 5 the shadow of the upper right-hand edge of the parapet, which is normal to $V'P$, falls across the wall, door, and upper riser; in the plan, its right-hand vertical corner casts a shadow across three treads of the steps; both, alike, are right lines at 45° to $G\,L$. It is evident that lines which cast oblique shadows in elevation, being horizontal lines, must in the plan cast shadows parallel to themselves; while vertical lines cast shadows at 45° to $G\,L$ in the plan, and vertical shadows in the elevation. Inspection of No. 5 and of Figure 38 will make this clear. The returning ends of stairs and window-sills; the invisible right and left edges of abaci of columns, of roofs, of porticos, and of projecting rectangular masses of building, are among the commonest examples of the application of this rule.

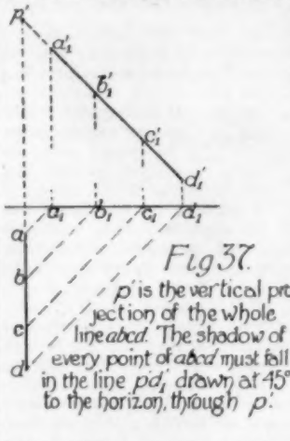


Fig.37.
p' is the vertical projection of the whole line abcd. The shadow of every point of abcd must fall in the line p'd'₁ drawn at 45° to the horizon, through p'.

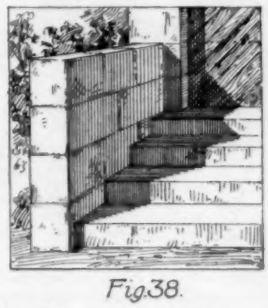
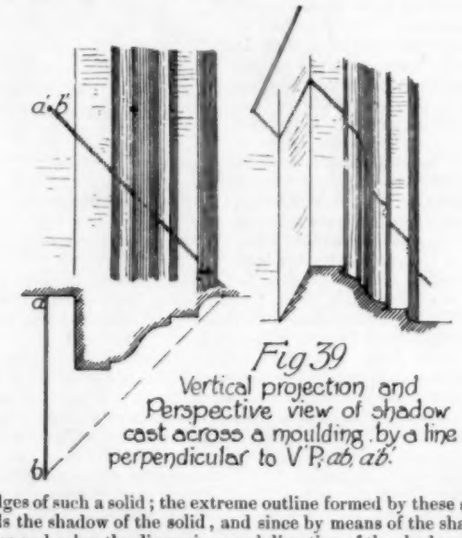


Fig.38.

45. Since all principal lines are either parallel or perpendicular to the plane of projection, Rules (II) and (III) suffice for obtaining the shadows of all plane and solid figures composed of principal lines, such as rectangles and squares, cubes and parallelopipeds, of every size and proportion. It is only necessary to cast the shadows of all the edges of such a solid; the extreme outline formed by these shadows bounds the shadow of the solid, and since by means of the shadows of squares and cubes the dimensions and direction of the shadows of their diagonals and of the sides of the inscribed octagons may be found; these two rules suffice for all the various classes of lines described at the beginning of this chapter, and the figures and solids composed of them, as may be seen in Nos. 2, 3 and 4 in Plate II, and in Nos. 6 and 7, which show their application to octagonal forms. But it will be advantageous to examine certain special cases more closely, and the following chapter will embody the application of these rules to the most important of them; namely, the square, "diamond" or lozenge, octagon, and their derivatives.



(To be continued.)

[1] It is hardly necessary to constantly repeat the qualifying phrase, "parallel to the projection of a ray of light," which may hereafter be taken for granted with the words, "at 45° to $G\,L$," unless the contrary is specifically stated.

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF MRS. JEREMIAH MILBANK, GREENWICH, CONN. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print, issued only with the Imperial Edition.]

THE building is about one hundred and eighty-five feet long and covered with Spanish tiles. The interior feature is the large hall with Connecticut stone fireplace and a window in staircase

10 x 19 in which, instead of colored glass, is a wrought-iron interior grill in the style of the Renaissance.

ARCHITECTURAL SHADES AND SHADOWS. — PLATE II.

SEE article elsewhere in this issue.

HOUSE FOR A. J. DREXEL, ESQ., LANSDOWN, PA. MR. WILSON EYRE, JR., ARCHITECT, PHILADELPHIA, PA.

HOUSE FOR J. DE. F. JUNKIN, WEST PHILADELPHIA, PA. MR. A. W. DILKS, ARCHITECT, PHILADELPHIA, PA.

COMPETITIVE DESIGN FOR CHURCH, CLERGY-HOUSE AND SCHOOLS FOR TRINITY CORPORATION, NEW YORK, N. Y. MR. W. HALSEY WOOD, ARCHITECT, NEWARK, N. J.

AUGUSTE RODIN. — VII.

THE DOOR.

Group from the Door. Auguste Rodin, Sculptor.

NO one outside of the little circle of Rodin's intimate friends had the slightest idea of the importance of the commission that M. Turquet had given him. At the time of receiving it he explained the plan he proposed to follow in its design, and that official expressed his entire confidence in the sculptor's ability to carry out any scheme he might undertake. "I was sure," said M. Turquet on a subsequent occasion, "that I had discovered a great artist, one fully capable of executing any task confided to him. The result, as is now well-known, has amply confirmed my judgment."

Rodin's friends were equally confident, for, though he had not yet made any work composed of many figures, save a decoration or two on vases at Sèvres, they felt that his single statues of "The Age of Brass" and the "St. John" gave unmistakable evidence of a rich imagination and a wide resource of conception. The giving of such an order to Rodin, in view of the unfortunate circumstances which had surrounded him since his return to Paris, and the opposition to him, as expressed by the leading art influences of the city in refusing to justly recompense him at the *Salon*, was regarded by him and his friends as a bold and noble act on the part of M. Turquet. This feeling was expressed by Dargenty in *L'Art* of 1880, when he wrote: "It is to the honor of M. Turquet that he has dared to order of Rodin a monumental door."

A year after the commission was given, a journalist, whose name is not known, found his way to the sculptor's studio and reported that "one has a right to hope that the door will introduce a new and large style of sculpture, a style very much needed in these days of antique imitations and commonplace School inanities." For the next year or two an occasional journalist also caught a glimpse of the door, in spite of the desired seclusion of the sculptor, and wrote his surprise at its colossal proportions, with prognostications of its eventual success. In 1883, *L'Art* contained a number of illustrations of the first sketches on paper of the subjects on the door, thus giving the readers of that journal the first idea of the character of the sculptor's starting-point. The exhibitions at Petit's galleries, 1885–86, before alluded to, caused a general interest in the sculptor's work, and before the close of 1887 the most distinguished art lovers, *literateurs* and critics of Paris, as well as many from Belgium and England, had visited his studio and seen the door. As its general composition was defined, its principal groups and figures decided upon in sketches, parts of the work completed, and nearly all of the hundreds of subjects in process of execution, its immense scope of design, startling originality and copious art expression were enthusiastically recognized.

It was declared to be the most important piece of sculpture of the nineteenth century, and nothing since Michael Angelo could give any idea of its magnificence. No illustration of any sectional part of the door had been made until February, 1888, when *L'Art Français* published a glyptograph print of the central portion of the upper part. This view is included among the illustrations of *The American Architect*, together with many of the figures and groups belonging to the door not before published, and the principal statues and busts executed by him; in all a more complete exhibition of Rodin's works than has hitherto appeared.

The preceding pages have been written for the single purpose of giving the bare facts of Rodin's life as they occurred, with the circumstances that immediately surrounded him, in order that the reader may be free to form his own impressions and draw his own conclusions of the directness of the sculptor's nature, his loyalty to it, and the simplicity and force of his character; of his single-mindedness, his courage, his perseverance, his high idea of art, and his perfect belief in himself.

The writer first saw the door and its author in November, 1887. On entering the studio, a large, barn-like looking place, he saw an enormous structure in plaster, reaching nearly to the ceiling. This was the door upon which more than seven years of the sculptor's time, of hand and head, have been spent, and upon which, in the words of his friend, Octave Mirabeau, he may well pass the remainder of his life.

The first impression is one of astonishment and bewilderment: astonishment at the size of the door and the style of its design, and bewilderment at the extent and variety of the forms that compose it. If possible, this impression is heightened by a glance at the floor, for half of it, as well as every available place on the walls of the studio, is covered with plaster figures, in every conceivable position, that are destined to complete the work. It is like looking into another and strange world. And it is only after repeated visits that this impression is succeeded by the more gratifying one of wonder and admiration of the prevailing life of the figures and the fine sense of true sculpture that everywhere abounds. All idea of subject, illustration or purpose takes a second place in the mind, or is forgotten, in presence of the charm, the sensibility, the divine touch of art that takes possession of the beholder. He stands like one willingly enchanted in an atmosphere created by the wand of a magician. If he looks upward, three sinister left arms, from as many herculean forms, point straight at him, as though in condemnation of his intrusion; if he turn to the right, his eyes meet the beautiful figure of a young girl, whose whole being is a picture of despair; if to the left, a commanding statue of St. John the Baptist bids him to waiting silence; if he turn around, the piercing look of the life-like sketch of Bastien-Lepage greets him, and at his very feet lies the mutilated body of a colossal Ugolino. Turn where he will, tread where he may, these silent images follow him like a united shadow.

Although the door is generally understood and popularly called, for description's sake, an illustration of Dante's "*Inferno*," it is only true to a limited degree. Of its design and the thoughts and sentiments that have actuated the sculptor, he says: "I had no idea of interpreting Dante, though I was glad to accept the '*Inferno*' as a starting-point, because I wished to do something in small, nude figures. I had been accused of using casts from nature in the execution of my work, and I made 'The St. John' to refute this, but it only partially succeeded. To completely prove that I could model from life as well as other sculptors, I determined, simple as I was, to make the sculpture on the door of figures smaller than life. My sole idea is simply one of *color* and *effect*. There is no intention of classification or method of subject, no scheme of illustration or intended moral purpose. I followed my imagination, my own sense of arrangement, movement and composition. It has been from the beginning, and will be to the end, simply and solely a matter of personal pleasure. Dante is more profound and has more fire than I have been able to represent. He is a literary sculptor. He speaks in gestures as well as in words; is precise and comprehensive not only in sentiment and idea, but in the movement of the body. I have always admired Dante, and have read him a great deal, but it is very difficult for me to express in words just what I think of him, or have done on the door. I have only read one translation, that of Rivarol, the five-cent edition, and I have always carried it in my pocket. Other translations have been recommended to me as better than his, more learned, but I have never seen them. Rivarol's seems to be clear, charming, simple, and without pedantry. He may not have been the greatest of men or the most profound scholar, but I like his translation. It has always satisfied me.

"The salient subjects of the door are the two episodes of Paolo and Francesca di Rimini and Ugolino, but the composition includes the three phantoms and Dante. I never so much as thought of Beatrice, though I know it is a beautiful subject. Perhaps I may include it yet, but it will be difficult to treat, because I only make nude figures for the door, and I don't feel like representing her nude. I can't think of her as a nude figure, and for the door she could not be made otherwise. Besides, she is an angel, and I don't see angels as bodies, only as heads. Neither do I represent Virgil."

Though the sculptor modestly says that he has been unable to fully represent Dante, the writer believes it will be heartily conceded that whenever he has treated any of the latter's subjects it has been with all the fire and comprehension of the text, and has produced works of sculpture equal to anything that ever came from the poet's pen.

[1] All rights reserved. Continued from page 200, No. 696.

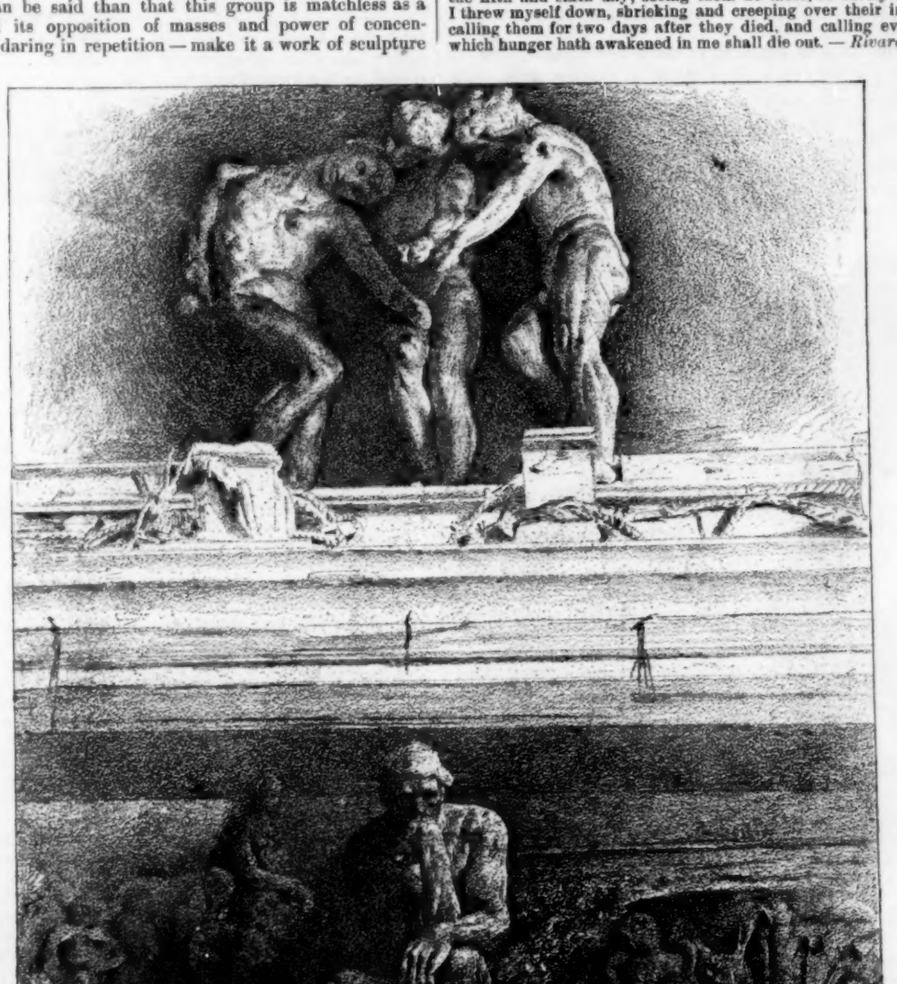
What greater sense of speechless dole could be shown than by the three phantoms which surmount the door:

> "It is I that saw the fall of the rebel legions;
> It is I that saw the guilty races pass;
> It is through me that they go to everlasting sorrows.
> The hand that made the heavens laid my foundations:
> My birth was before men or days,
> And I shall remain longer than time,
> Enter, whoever you may be, and leave hope."
> *Rivarol's Translation.*

Nothing less can be said than that this group is matchless as a conception. And its opposition of masses and power of concentrated purpose — daring in repetition — make it a work of sculpture as fine as it is original. It is a trio of despair; a drama conclusive in design and propriety of place. It tells the story of the whole door.

And the Dante: he that looks down upon hell. For an expression of a deep understanding of and a penetration into the very soul of him who walked through the abodes of the cursed and saw its endless grief, what could be more complete than this statue. This awful Thinker: seen from his left, he looks like a bird of prey contented with the vengeance he has meted out to the vile of the earth; a composition of physical and mental dominance, an effect of personality seemingly without a rival in all the sculpture of the world. More vital than he of the Medici Chapel, and more to be feared than the motionless prophet who keeps his vigils in the icy loneliness of St. Pietro in Vincula. Here, then, are two works every way worthy of the imperial source that suggested them; as complete, as firm, as living. Of Rodin's power of seizing the most dramatic point of a subject, the group of Ugolino and his sons is a terribly real example. Various artists have treated this subject at the moment when the father is in the act of biting his fingers in the first scene of his agony, and when his sons are suffering the first pangs of hunger. Rodin goes at once to the depths of the whole tragedy. The youths have fallen to the ground, and Ugolino, seeing them so, and feeling the full terror of his situation, throws his own emaciated carcass down and crawls over the bodies of his offspring like a beast benumbed with rage and famine.

> "They expired at my feet, falling one by one, all my three sons, between the fifth and sixth day; seeing them no more, so surely had they fallen; I threw myself down, shrieking and creeping over their inanimate bodies, calling them for two days after they died, and calling ever until the grief which hunger hath awakened in me shall die out. — *Rivarol's Translation.*



Clay Model of the Top of the Door. Auguste Rodin, Sculptor.

The impression made by this being is so forcible that it seems more like the half-conscious response of an unburied corpse to the trumpet of the resurrection than the closing moment of a period of torture. So far as delineation of subject is concerned, this group stands quite alone in vividness and dramatic force. It is the horror of the door.

The other important subject included in the scheme of the sculptor is the group of Paola and Francesca di Rimini, the first study of which was too large for the purpose intended, it being over half life-size. It represents the lovers sitting close together with their arms around each other. Its whole expression is the embodiment of accordant love: beautiful in its contrasts of form, delicate and chaste in sentiment. Paolo, the strong, sensitive, tenderly expectant lover; Francesca, the fully confiding and willingly submissive mistress. No note or vibration of this exquisite subject that was not lived by the sculptor while this group came into being. It was exhibited in Brussels in 1887, and criticised because it was nude.

"What! make them naked. Who ever heard of such a thing. It's dreadful." That it was a superb piece of sculpture passed unnoticed.

Of the many studies which the sculptor has made of this subject, the one that will go on the door represents the figure of a powerful man holding to his breast and neck, with all the desperation of undying love, the folded together form of a woman. The composition of this group is as original as the comprehension of the sentiment is fervid. It seems as though the soul of the woman, in its haste to meet her lover, had shot through the air like a thought, to find rest in his arms. Neither figure seems fully conscious of the apparent effort of their bodies, it is like something their hearts alone have done. In no work of art familiar to the writer in which corporeal bodies are represented as going through space without effort is there such a complete expression of this illusion as with the figures on the door, and this group is perhaps the most emphatic of them all. It is the urgency of a great emotion unchanged in identity and individual force even during that mysterious moment when life on earth closes.

The penetrating personality of these five pieces of sculpture, and the varied character of their execution find an abundant counterpart in the other figures of which the door is composed.

The whole structure is about eighteen feet high and twelve feet wide. The door itself, which is immediately under where Dante sits, is not divided into a series of panels, each containing a special subject and treated independently, as great doors generally are, but represents a perpendicular section of the damned world, without apparent background, and with a slight moulding running through the centre from top to bottom.

The formations of rock, sea, fire and cloud are peopled with the phantoms of human beings, syrens, harpies, fauns, furies and monsters; all in more or less movement, according to the desires, emotions or propensities of their natures while on earth, and as affected by their present surroundings. They sail through the air, dive into the sea, dart here and there as though they were possessed, or stand as motionless as death.

The spectator looks through the framework of the door into this indescribable scene. Many of the groups and figures are in full relief, and are placed well in advance of the surface-line of the door, and from them the relief gradually lessens until the dimmest perceived distance shows the vanishing forms in delicate mass or outline.

The frame of the door, composed of small mouldings setting well out from it, is also covered in the most surprisingly ingenious manner with figures of every kind, age and sex, making it appear like the shores of an overflowing sea of uneasy souls impossible to keep within the stately authority of an architectural form. The sculptor, more pitiful than the poet, grants a little respite to these unfortunates, and permits them to leave their direful abode. Or, carried away with the endless procession he has unguardedly set in motion, and in no way restricted by the arbitrary topography of the poet, he in very truth lets Hell loose, and the limits of that locality are only bounded by the imagination of the artist.

After the first large sketch of the entire structure had been determined upon, the sculptor intended to model the sculpture in wax on its background of plaster, but as this material was found to be too expensive, clay was used in its stead. The figures were then cut off in pieces and sections, and cast in plaster. The present task of the sculptor is the further finishing and replacing them in their proper order and composition. The size of the figures vary from six inches to about four feet in height. If the reader remember the very modest price which Rodin received for the statues he sold to the Government, he may correctly surmise that the amount paid for the door is still more modest. For the price of his own work in making the plaster model the sculptor cannot be very exacting, but for its reproduction in bronze it is an absolute condition that it shall be by the wax process. And it may be here added that the French nation, in the large majority of cases, owes far more of its art-glory to the individual sacrifices of its artists than to any organized influence.

The large unfinished panel, or the tympanum of the door, before which Dante sits in silent state, contains two subjects, that on his right, "The Arrival," and the one on his left, "The Judgment." The first represents a crowd of spirits pushed on by relentless destiny in hurried disorder to the bank of the Styx, where they await the arrival of Charon's boat. The central figure of this part of the panel is a kneeling female satyr clasping her hands behind her head. She personifies sensual passion, and expresses in her position the consciousness of her condition and readiness to accept the coming punishment.

The principal figure of "The Judgment," is a young girl whose right hand is raised to her chin, the latter meeting it at the shoulder, while her left arm is extended near her body. If any distinction can be made in regard to the character of the sculpture on the door, this statue would be called the most beautiful. Beautiful in every sense, in its life, naturalness, delicacy of outline and exquisite sensibility of modelling. It is a delicious consummation of girlish despair. If an unexplainable fate has placed her among the lost when she ought to have bloomed in Paradise, it remained for the humane artist to reverse the judgment and preserve her as an embodiment of innocence, a joy to the hearts of the generations that will see her here.

This figure, like many others made by the sculptor without reference to any personality, has suggested to the minds of writers and others a variety of names, though it has no name. It may be selected as an excellent example of the character of Rodin's art temperament. He works from the force of the sentiment that possesses him, that he lives, and not from the motive of any given name or outwardly defined subject. The Ugolino group is the chief point of interest of the right-hand part of the door, and is placed on a line with the eye of the observer.

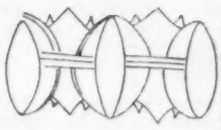
At its left there will be a group of human and half-human figures surrounding "The Three Syrens." These syrens, unearthly creatures, weird and seductive in every form and movement, make perhaps the most subtle composition on the door. No illustration can give any idea of their charm and color, for their beauty begins and ends with themselves. It is just praise to say that they are beyond the reach of the camera.

Just behind them stands a splendid youth, in full relief, with his hands clasped over his head, looking in wonder at a kneeling female figure at his feet, and perfectly unconscious of his woeful surroundings. Above him is a group, also in full relief, of the noble figure of a man, and three equally fine ones of women, the latter representing fear and uncontrollable grief. A short distance below Ugolino a narrow panel begins, which has two central pieces of masks of those who have died in misery, and the spaces on each side are filled with an illustration of the festival of Thetis and Peleus when invaded by Centaurs. Thoughtless pleasure is personified by a youth borne on the back of a syren, who is about to dive into the sea carrying her joyful and unconscious victim with her.

[To be continued.]

THE LOTUS IN ANCIENT ART.[1] — V.

THE EGG-AND-DART MOULDING.



DURING the study of the Cypriote pottery in New York which was prompted by Mr. Clarke's article on the capital of Neandreia, I observed some vases with lotus borders suggesting an analogy with the "egg-and-dart" moulding. One of these borders is shown in Figure 1. A little examination and comparison proved this decoration to be a double lotus border, of which one side appears in 2, taken from another vase. In this border the dart appears in primitive form as the central triangle of a simplified lotus resembling 3. The ovals

2 3 4

corresponding to the "egg" of the moulding are formed by the connecting exterior curves of the flowers. Between the flowers, *i. e.*, in the middle of each oval, is placed a bud.

This observation was assisted by the comparison with a decoration in bronze found at Olympia (4) bearing some resemblance to the moulding in question, in which the motive is a simplified lotus form corresponding to 5.

It then occurred to me that the excavations at Naukratis in the Nile Delta ought to have revealed some traces of this connection if it really existed.[2] I accordingly turned to the then recently issued publication of the Egypt Exploration Fund, "*Naukratis I*" and found the conclusive demonstration. This is offered by the architectural mouldings herewith which are copied from the plates in

5 6 7

"*Naukratis*." Nos. 6 and 7 are clearly lotus borders in relief. When reversed they are "egg-and-dart" mouldings (8, 9). If the mouldings of the Erectheum are compared and reversed in the same way, it appears that they are simply deeper cut modifications of the same motive (10, 11).

From the same Ionic temple at Naukratis comes the column necking shown at 12, which corresponds to the necking of the columns of the Erechtheum. In this modification of lotus border the forms looking like spear heads on either side of the lotus nearly resemble

[1] Continued from No. 696, page 202.

[2] Naukratis was ultimately the only Greek colony of the Nile Delta because ultimately the trading privilege was confined to it, but the Greeks were never confined to this spot as individuals. They formed the most important mercenary force of the Egyptian kings from the middle of the eighth century B. C., until the Persian conquest, 525 B. C. The excavations at Naukratis date from 1885.

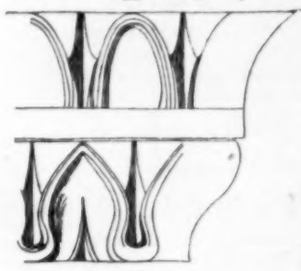
the buds of the blue lotus, which occasionally have the same square angled section. This is attested by the botanical cut of the buds of the blue lotus in the *Description de l'Egypte* as well as by personal observation from nature. It is quite likely that the forms were mistaken for spear heads by the Greek artists. The diamond-shaped form looking like an arrow head above the lotus proper in (12) is not more remote from the central lotus calyx leaf which was its original form than are the exterior spear heads from buds.

8

9

Comparison of the lotus buds on the ovals of 2 with the design on the relief oval of 6 shows that this also is a bud and the elementary original form of the pointed decoration seen on the "leaf" oval of the Erechtheium (10, 11). The "egg-and-leaf" moulding, so-called, seen in one line of the Erechtheium moulding, is of course only a modification in outlines of the "egg-and-dart."

It thus appears that the "egg-and-dart" moulding is a decoration in which the egg is originally an oval projection resulting from the



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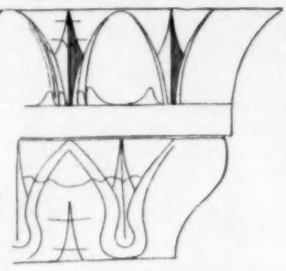
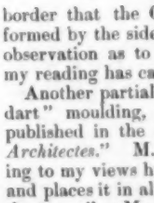


11

incised cutting of a series of simplified lotuses placed side by side.[1] It is well known that the ornamental motives of Egyptian architecture were mainly painted rather than incised. It is also a matter of general information that the development of ornament in Greek Art was one from decoration by color in flat to decoration in low relief and that the incision grows deeper and the relief higher according to sequence of time. Under-cutting first appears in the Greco-Roman art and this also grows in extent and depth according to sequence of time.

According to the foregoing observations the supposed "leaf" decorations found in color on the capitals of the Doric order and elsewhere (Figure 13) will also reveal themselves as reversed lotus borders.

After making the foregoing observations I was somewhat disappointed to find that they had been partially anticipated by Owen Jones as early as 1856. According to the prefatory remarks of the "*Grammar of Ornament*" the "egg-and-dart" moulding is derived from an Egyptian border in which lotuses alternate with bunches of grapes. The bunches of grapes are said to be the origin of the egg. An example of this border is shown in the "*Grammar of Ornament.*" The illustrations offered in this paper from Naukratis make the hypothesis as to the bunches of grapes quite unnecessary. It is not from one of the rarest but from one of the commonest forms of Egyptian



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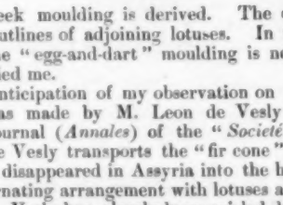

13

border that the Greek moulding is derived. The oval is simply formed by the side outlines of adjoining lotuses. In this sense my observation as to the "egg-and-dart" moulding is novel so far as my reading has carried me.

Another partial anticipation of my observation on the "egg-and-dart" moulding, was made by M. Leon de Vesly in 1871 and published in the Journal (*Annales*) of the "*Societé Centrale des Architectes.*" M. de Vesly transports the "fir cone" which according to my views has disappeared in Assyria into the heart of Egypt and places it in alternating arrangement with lotuses as the origin of the "egg." M. de Vesly has clearly been misled by the bulbous form of the lotus buds in the border in question (see the bulbous bud of the rose lotus, from nature, in my last paper). "Fir cones" are unknown in Egyptian ornament, but the mistake is equally clear in either case. The bud is placed *on* the oval (see 2, 6, 10 and 12). There is no case of an Egyptian border in which the oval itself is formed by the bud and no case in which the bud can be assumed to have formed the starting-point of an oval. (It is worthy of remark that a projected "egg" moulding without the dart is as old as the fourth dynasty, as appears from an illustration in M. Dieulafoy's "*Monuments Antiques de la Perse.*")

[1] The "dart" is an ultimate rudiment of the central calyx leaf.

The importance of the fact to which this paper is devoted is not to be judged by the brevity of the demonstrations. The intimacy of relations thus proved to have existed between Egyptian and Greek decorative art reacts on the whole argument as to the importance of Egyptian lotus forms as basis of early Greek ornament in general. Any supposable inherent improbabilities as regards, for instance, the Egyptian origin of the Ionic capital are entirely removed by the demonstration for the moulding which is constantly found on it. The Greek colonies of the Nile Delta dating from the eighth century B. C., precede by three centuries the present known cases of a developed Greek "egg-and-dart" moulding and abundantly explain the Egyptian influence in question.

Wm. H. Goodyear.

[To be continued.]

THE INTELLIGENT BUILDING-COMMITTEE.

M. SUFFIT reports in *L'Architecture* the transactions of a special meeting of the Council of Architecture of an imaginary department called on the twenty-ninth of February last to consider the designs for a town-hall, which have been prepared by Mr. Beauplan, architect, and have been awarded the highest place by the jury of experts. Mr. Beauplan's drawings are spread out on a table, and are examined with much interest by the members of the Council who have arrived earlier than the rest, and who occupy the time in exchanging views upon architecture in general and architects in particular.

"Yes, my dear Mr. Hedgerow," says the legal member of the Council, evidently in conclusion of a long story, "the architect had forgotten the stairs in the house; just think of it."

"I can easily believe it, my dear sir, for the same thing happened to the architect of a cousin of mine. I have often heard my aunt say ——"

"There is nothing surprising about that," interrupts another. "They are always doing something of the kind, and I could tell plenty of stories of similar forgetfulness. The explanation is very simple: the stairs are in their way, and so they suppress them."

Then everybody laughs.

At this moment the President of the Council enters. All the members seat themselves, and the President announces that the object of the meeting is to examine and pronounce upon the merits of the design submitted, and to make such suggestions as may seem advisable, which, if the Council so decides, will be followed by making a modified design in conformity with them.

The architect is then invited in, and the legal member takes the floor. He begins by felicitating the architect upon his manner of laying washes of India-ink, about which, as he says, he happens to know a good deal. He would like, however, to inquire why the entrance-hall is placed over the vestibule, and why there is no stairway from one to the other. "Ordinarily," he adds, "these two apartments are on the same level, and open directly into each other." "You see," he remarks to the architect, "I know something about these matters."

"But," expostulates the architect. "But?" repeats the other angrily, "I have eyes, and I say there is no staircase shown."

"But," persists the architect, "the drawing before you is a floor-plan, and the rooms are shown on a level, not one over another."

"Oh, then this is a floor-plan, is it? Why is it not written so on top? You cannot expect people to guess at these things. Let me advise you, Mr. Architect, to put always on top 'Floor-plan'; then people will understand."

"Mr. Architect," gently inquires Mr. Goodman, the President of the Charitable Association, "are your plans made by hand?"

"Ordinarily, sir, we make them by hand when we have time enough."

"Ah! I have heard that there are machines for that. I suppose, in fact, that you could hardly do it all yourself."

Mr. Shorts, President of the local grange, takes the floor. "Why do you have so much black on this drawing, Mr. Architect?"

"Those are shadows, sir."

"Now stop right there. You acknowledge that they are shadows. That is unfortunate. In a town-hall it is very necessary to be able to see clearly. No one wants to have the gas lighted all day long. I see you have no windows in your section; that is why you have to make those black shadows."

"But the windows are not on that side of the section."

"Well, then, put some there. I tell you that we must have light. What do you say, Mr. Beetroot."

"I am entirely of your opinion, my dear colleague, but permit me to ask Mr. Beauplan one question: Why are the shadows in your section surrounded with red?"

"That, sir, is the conventional color for showing sections."

"Oh, dear me, what do we want with the Convention and the Sections. You know we don't want political emblems on our plans. I advise you to rub out that socialistic red, and put red, white and blue in its place."

Here Mr. Hairygoat, member from a manufacturing town, leaps to his feet.

"Mr. Hairygoat," says the President, "you have not the floor."

"I know it, Mr. President, and that is why I take it. I vote for the red, do you hear. That is the color of the supremacy of the public, and a town-hall is a public building."

The President: "Well, gentlemen, to satisfy every one, I will ask the architect to make one side of his section red, and the other red, white and blue."

Enough of this. Mr. X., member of Congress for this district, has the floor.

Mr. X. rises. Profound silence. "Gentlemen, to the interesting objections which have already been made to the plan, I will add only one, relating to the façade. Why, I would like to know, are those lead-lights put in the windows? In our town, we built last year a lock-up, and there were no lead lights in the windows; yet every one said it was a splendid building, and it was done by the best mason in the town. We have no millions to spend on our buildings. We must keep the cost moderate. What do you think, Mr. Senator?"

"I think that the public interest must be guarded. Mr. Architect, do not forget to have weather-strips around the doors. They keep out the cold in winter."

The President: "Has any one anything more to say? The meeting is closed."

PFEIFFER'S AMERICAN MANSIONS.

WE have been not a little disappointed that the architects of this country, giving due weight to the circumstances, have not accorded a more hearty support to the proposition that was submitted to them last autumn in the form of the subjoined circular:

BOSTON, November 15, 1888.

DURING the past ten years or more of his life, the late Carl Pfeiffer, F. A. I. A., of New York, busied himself in preparing for publication a work on American Domestic Architecture, and during this time had prepared with much elaboration over three hundred drawings.

The executor of his estate, finding it necessary in the interests of Mr. Pfeiffer's family to realize all that was possible, has asked us to undertake the publication of this material. This we have consented to do, provided that the members of the architectural profession, taking the circumstances into consideration, will assure us by their subscription that the undertaking will be of value to the beneficiaries.

On examination, we find that from the material there can be selected 100 plates, 14 x 18, which we propose to publish in five parts, each part containing twenty plates, at the price of $1.00 for each part, payable on delivery or for the entire work in advance; and you are invited to signify your willingness to subscribe for the work by filling out either of the annexed forms.

The drawings represent designs by Mr. Pfeiffer for dwelling-houses of various classes, with all their details both, decorative and constructive, carefully worked out. The draughtsmanship is excellent, and many of the drawings have been made by Mr. Bassett Jones and other draughtsmen of nearly equal capacity.

Trusting that we may hear from you promptly on this matter, as publication depends entirely on the response we receive, we remain

Very truly yours, TICKNOR & Co.

Those who have subscribed for the work have done so with expressions of warm approval of the undertaking, but the plain fact is that unless a greater number of subscriptions can be secured the benefit accruing to Mr. Pfeiffer's family is likely to be but small.

If any of our readers have overlooked the matter, we ask them, once more, to send in their subscriptions at once.

SOCIETIES.

BOSTON ARCHITECTURAL CLUB.

THE regular conversazione of the Club was held Wednesday evening, May 8. During the week the successful drawings of the past six years in competition for the Rotch Travelling-Scholarship have been on exhibition at the rooms of the Club, and the conversazione was entirely devoted to an examination and discussion of these, while at the same time, the general subject — the scholarship, its aims, methods and achievements, was considered in detail. Prof. F. W. Chandler of the Institute of Technology was the first speaker. He spoke of the advantages of just such training as competition for the scholarship can give a student, and expressed regret that so few of our younger men should have presented themselves for the recent examination; a problem such as that worked up by Mr. Bacon, the successful competitor for this year, is a great help to one not only in a general way, as influencing the ordinary problems of everyday office practice, but is also the very best preparation for a trip abroad, enabling one to more truly appreciate Europe and its monuments. While the advantages which would accrue to any one travelling under such a scholarship, the special opportunities for study and research which would be offered only to one who is, in a measure an official delegate from the profession in this State, are such as would make the prize worth far more to the holder than the mere amount of money which he receives with it. Prof. Eugène Létang was called upon by the Club, and responded with some excellent criticisms of the competition drawings, continuing Professor Chandler's remarks about the value of serious systematic study. In the general discussion which followed many suggestions were offered in regard to the scholarship; and the general sense of the meeting seemed to be that it was perhaps desirable to hold the competitions earlier in the year, at a time when architects would be less busy with office-work, and the draughtsmen would consequently be more free to compete; and it was questioned whether the scholarship, which is now open only to those who have been employed two years in the office of a Massachusetts architect, should not be extended to any one, no matter what his previous training, who was able to successfully compete for the prize. It was also suggested that the labor involved in preparing the competition drawings might be lessened by having a preliminary sketch made by the competitors, and from those offered, three to be selected for a final competition. In reply to inquiries as to the expense which the competition entails upon those who enter it, several who had taken part during past years agreed in stating that the total cost to a student, aside from the time, need not exceed ten dollars, as that amount would cover all strictly necessary outlay.

The meeting was closed with a description by Professor Létang of the manner in which the competitions are conducted for the Grand Prix de Rome, in Paris. The attendance was quite large and a great deal of interest was evinced in the scholarship and the prize drawings.

THE SKETCH CLUB OF NEW YORK.

WILL you please announce under heading of "Societies" that the Secretary of the Sketch Club of New York may be addressed at No. 57 Broadway. Very truly, WILLIS POLK, *Secretary.*

COMMUNICATIONS.

A STAIN FOR BRICK WALLS.

AKRON, OHIO, April 22, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can you furnish us with address of parties handling a successful stain for brick walls (not an oil paint), so as to produce a realistic flat brick appearing surface.

Oblige respectfully, WEARY & KRAMER.

[TRY Samuel Cabot, 70 Kilby Street, Boston, Mass. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

SEVILLE CATHEDRAL. — The ruinous condition of Seville Cathedral has become so serious that the Spanish Minister of Public Works has appointed several eminent engineers and architects to go down and report on the state of the cathedral, and the best plans for rebuilding this magnificent specimen of Gothic architecture. At least ten million pesetas would be required to rebuild the famous cathedral and the Giralda tower. The repairs attempted last year, when several pillars in the central nave were discovered to be in a ruinous state, have proved insufficient, many more pillars in other parts of the cathedral being in a very bad condition. The Government is disposed to ask Parliamentary assistance for the Seville Cathedral restoration, as the subscription started in 1888, under the patronage of the Queen-Regent, has not been very successful. The decision has been arrived at none too soon. For many years past this magnificent specimen of Mauro-Gothic architecture has been falling more and more into decay, until temporary repairs are no longer sufficient to stay the ravages of time. Pillar after pillar has fallen away, and, unless the roof is speedily strengthened, the famous church which for ages has attracted sight-seers to the capital of Andalusia will be in imminent deadly peril of collapse. A subscription was opened last year for a repairing fund. But money is not readily extracted from a Spaniard's pocket, and 10,000,000 pesetas — £400,000 — is a heavy sum to collect in a poor country, where every other city has a church which it considers the finest, or among the finest, in Christendom. Accordingly, Parliament will probably be asked for help, and it remains to be seen whether the Cortes, which requires all the funds at the disposal of the Treasury for needs far more pressing than the restoration of old buildings, will be inclined to take the same view of the matter as the rest of the world. For the Cathedral of Seville, and above all, the Giralda Tower, which forms part of it, have been, like the Alhambra and many other remnants of the palmy days of the Moorish rule in Spain, in one sense

the property of mankind at large. In truth, it is a question whether the hundreds of painters who have drawn it and the thousands of visitors who have admired it have not appreciated the building quite as fully as the race who are its custodians. Seville without the Giralda would assuredly be a pleasant town. At this season it is scented with orange blossoms and embosomed in joyous greenery. But without this most celebrated of its "lions," the place would fall in public esteem to the level of any other sleepy provincial city. The Giralda is the first of the spires of Seville to come in sight, and the first to be visited. The omniscient schoolboy of Macaulay could tell how the lower part of the tower was built in the latter half of the twelfth century, by order of Sultan Abu Yusuf Yakub, and the upper portion, with the belfry, surmounted by the bronze figure of "Faith," by Fernando Ruiz, 400 years later. The cathedral is now the larger of the two structures. But, historically, it is simply an accretion to the Giralda.—*London Daily Telegraph.*

Floating Exhibitions.—Floating exhibitions seem to have taken, at least so far as Germany is concerned. The German Export Company has decided to apply the sum of £250,000 (5,000,000 marks) to the building, equipment and working of a very large steamer, which is to serve as a floating exhibition. The vessel in question will be called "*Kaiser Wilhelm,*" and the principal dimensions are as follows: length, 564 feet; breadth, 66 feet; depth, 46 feet; so the question is not of a small craft. The steamer is to have four engines, entirely independent of each other, and four propellers. She is to be fitted in exceptionally good style. The expenses for a two years' tour are calculated at £157,000, while the takings for hire of room and profits on sale are expected to reach £363,000, leaving the very handsome profit of more than £200,000. The steamer will, according to the present arrangements, be ready to start in the spring of next year. A previous undertaking of a similar nature, the steamer "*Gottorp,*" despatched from Hamburg, is understood to have given a satisfactory result. Not only are German goods being shown in many different parts of the world, but the staff accompanying steamer has ample opportunities for studying in each place the various local and special requirements, and to see to what extent and in what manner the different wants are being supplied, either by home or by other foreign makers.—*London Engineering.*

Liability of Landlords of Furnished Houses.—When *paterfamilias* packs up his traps and conducts his family to the seaside, one of the expenses for which he makes provision in his estimates is the doctor's bill for the typhoid, which may be contracted in the lodging-house, where it takes up a permanent billet, says the *St. James Gazette.* Will he mend matters if he shuns the delusive "Apartments To Let," and takes the whole of a furnished house? No: he will catch the typhoid all the same; but he can get damages out of his landlord, and that is a comfort, if he only lives to bring his action. Let not the worthy man imagine that he has a similar remedy for a similar grievance against the landlord of his house in town. The rule which was once again laid down recently in Charsley *vs.* Jones is only applied to "furnished houses," as to which there is, in the eye of the law, an implied undertaking that they are fit for human habitation. With regard to the ordinary house leased in the ordinary way, there is no such legal fiction. If the new tenant wishes to make himself safe, he must get an express undertaking from his landlord; or, if he likes, he may call in a sanitary adviser, who will explain that for the outlay of an amount equal to about three years' rent he can make himself tolerably safe against drain fever, provided, of course, that his neighbors have taken the same precautions.

An Underground Railway for Paris.—M. Berlier has laid before the Société d'Encouragement a scheme for an underground tubular tramway for Paris. There would be three independent lines: one from the Place de la Concorde to the Bois de Boulogne, a length of about two miles; another from the Place de la Bastille to the Place de la Concorde, about three miles long; and the third from the Porte de Vincennes to the Place de la Concorde, a distance of nearly five miles. The plan suggested is to have a circular iron tube, 18 feet, 4 inches in diameter, containing a double line of rails of 3 feet, 7 inches gauge. The service is to be carried on by single cars, driven by electric-motors, and running at intervals of one minute. The rate of speed would be much greater than with omnibuses, and stations would be built at various points. The cars are to be lighted electrically. M. Berlier estimates the cost of these lines at £2,160,000, the annual working expenses at £96,000, and the annual receipts at £240,000. It will be noticed that the whole scheme appears to be founded on the London, City and Southwark Subway, with the only exception that the up and down lines are to be placed in the same tunnel, instead of in separate tunnels, as is the case in Mr. Greathead's subway.—*Industries.*

TRADE SURVEYS

Manufacturing, railway and commercial statistics for April and the first four months this year just published, indicate an expansion of business in the aggregate, a decline in margins and profits, and an exceptional lull during the past few weeks. Development has been irregular. Certain industries and commercial lines have prospered, while others have lagged behind. A careful study of all facts affords instruction if the deductions are properly drawn, financial authorities who have recently spoken on the business showings so far this year, intimate that there are evidences of a possible stringency in money, that the conditions to create it are at work, that the needs for a larger volume of money are increasing, and that the element of risk in business and in investments is increasing. These deductions, if true, are important, but it is easy to recall numerous prognostications by financial authorities in past years that were proved incorrect. Industrial observation and experience, however, corroborates these views in a measure; while the money in circulation in the country is the largest ever known, viz., $1,414,000,000, the enormous investments temporarily unproductive are having the effect of creating an apparent stringency in speculative circles, but not elsewhere. The bank clearings for the first quarter of the year show an increase of 17.2 per cent over last year, and yet jobbers and retailers complain of widespread dulness. The explanation is that wholesale activity in anticipation of future retail demands has not been impaired. The general Government has in cash, $313,974,512; the Government deposits in National banks foot up $48,669,815; Government receipts for April, $31,458,799; disbursements, $22,457,781. Among the railroad probabilities of the near future are an alliance between three or four of the larger American and Canadian railroads, by which the smaller roads now running at a loss will be saved, and a new through route under a centralized control created. The railway situation continues unsatisfactory. The United States Senate Committee is this week seeking information from the highest railroad sources concerning the effect of the Interstate Law on railroad earnings. It is only a question of time for a conflict to arise between the public and the railroad corporations over the existing laws. In the industries prices are still receding, and this is the secret of the dulness. One leading Pennsylvania iron-maker dropped prices $1 per ton, to shut out Southern iron which is every month becoming more pronounced. Six new blast-furnaces are nearing completion in Northern Alabama. The iron trade is suffering; last week rails dropped $1 per ton, and $25.50 at mill is now threatened. Lake-ore miners are booking immense contracts; mills and furnaces are being put in shape for greater activity. Confidence in a mid-summer revival of activity is widely expressed, and locomotive and car-builders are slack, but ship-builders have not room or plant enough to take all business offered. The coal trade is dull; anthracite producers will soon have facilities to store between three and four million tons, which can be made to cover two to three months' demand in case of a strike. Threatened miners' agitations in the Western States have been nearly all adjusted. Two strikes occurred in the building trades, one in Chicago and one in Pittsburgh; elsewhere quietness prevails. Building activity is phenomenal; between four and five thousand houses have been started this year in Philadelphia, and in Pittsburgh manufacturers are driven into suburban localities for sites. Among machinery-makers there is great activity, especially for heavy machinery for mill, mine and factory use. Despite the dulness in manufactured products, there is a very general extension of capacity. Cotton mill-building in the South continues, and the promotors and investors refuse to be frightened at pessimistic warnings; all the favorable conditions in the South, heretofore referred to, continue. The lumber manufacturers have been successful in maintaining prices, especially in hardwoods, and an expanding market is helping business among machinery-makers. A poplar convention was held in Cincinnati on Tuesday, to take further advantage of the bettering conditions. Lumber is reaching market from a much larger number of places than a few years ago, and hence the influence of lumber centres on the market is declining. Building material has held its own; nails are $1.60 to $1.90 East, and $2 West for steel and $2.40 for wire nails. Barbed-wire manufacturers have more business than they can do at present; sheet-iron mills are quite busy; long gas-pipe lines are to be laid this season. The consumption of all kinds of material will be large and continuous; but, owing to the enlarged capacity during the past twelve months, buyers are not obliged to place their orders two to four months in advance as formerly. The reports from architects are quite encouraging. Fully as much work is on the boards as at any time for years. The generally improved character of work has increased the demand for skilled assistance in building work, and a larger number of young men are engaged now than ever in the history of the profession. As heretofore stated, much work is being done in the smaller cities and towns.

The efflux of manufacturing capital and capacity from larger cities continues on a large scale. Annexes are springing up, and numerous little industries find existence possible where rent, power, fuel, labor and taxes are 10 per cent less than in populous centres. The extent of this industrial rearrangement is greater than supposed, and hundreds who are contemplating the establishment of shops are looking for opportunities in entirely new locations. Foundries, saw-mills, wagon-shops and machine and boiler shops and the like are multiplying throughout the interior and west of the Mississippi. There is a constant cheapening in the cost of fuel and manufacturing interests in the far West which have been chocked by excessive prices for fuel, now see reductions within their grasp amounting to 25 to 40 per cent. This means a rapid outgo of industrial life in the near future. A new field for American enterprise is opening up in Honduras and in Central American States. Railroad enterprise is proposing to build a line of road in Honduras that will stimulate the development of the supposed richest silver mines in the world, and in the development of the fruit, mahogany and rubber trades. Then recent schemes have been started looking to the establishment of steamship lines, and inquiries as to cost of vessels have been made within two weeks at Delaware River ship-yards. A copper mine said to be the richest in the world, according to the customary enthusiastic report, has been developed in Mexico, and promotors are hard at work at it. The Paris speculators are in feverish anxiety as to the probable extent of their losses, concerning which cable reports are unsatisfactory. The development of new and rich mines of precious metals is very important in view of the rapid expansion of trade and commerce throughout the world. More coin is needed, and whatever differences of views may exist regarding the utility of paper money, gold and silver is in demand, and the need of it will grow possibly more rapidly than the supply. Some financiers, who study the mining interests, look for a boom in business within a year or two as a result of greater supplies from newly discovered deposits. The production for years past has been practically at a standstill, and it would seem that there is a great need of an increased supply of precious metals. Experts estimate, perhaps rather loosely, that when projected improvements are made the capacity of the Western and Mexican mines will be increased fully 25 per cent. The country certainly needs more gold and silver, especially as there is no easy or practical method of preventing a large and steady draw to Eastern countries, where the demand will doubtless increase as commercial relations become more intimate. Within the past four months American electric-lighting companies have closed negotiations for electric-lighting plants in nearly every civilized country on the globe. The increase in business is marvelous; all electrical, well-equipped companies are crowded with work, and it is evident that foreign work will grow rapidly. Since January 1 estimates and information have been requested by some thirty or more large and small interior municipalities regarding electrical roads. The cost of power is being reduced, and the early clearing up of difficulties in point of economic use is assured Stores for the prompt distribution of electrical supplies are being established by Eastern companies over the West, and storage facilities for agricultural implements are being extended. Both mining and agricultural operations will be greatly extended from this out. What is now needed to impart an upward tendency to prices is a covering of manufacturing, railroad and mercantile requirements, to no greater extent than is usual, and which would now be covered but for the fact that buyers are not confident that present prices are the lowest. The assurance that rock-bottom has been reached would start demand and give prices an upward tendency.

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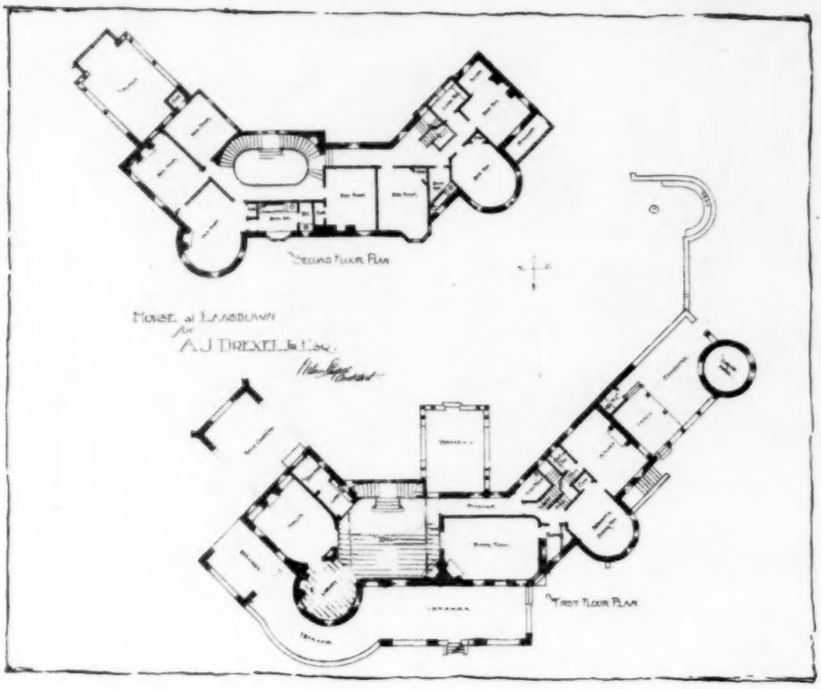

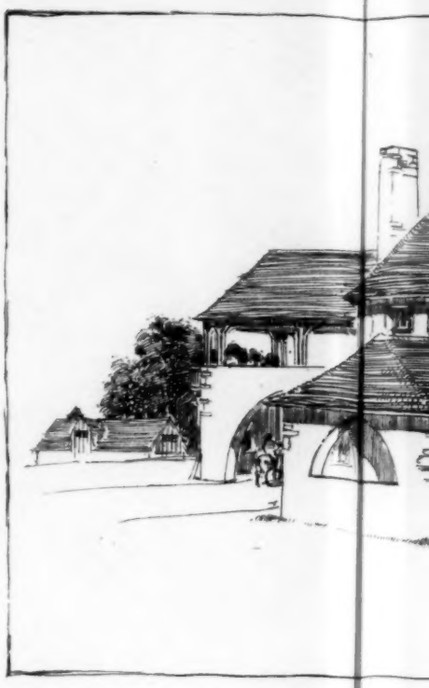

VIEW FROM THE SOUTH. W. EYRE del.

VIEW FROM THE NORTH. W. EYRE del.

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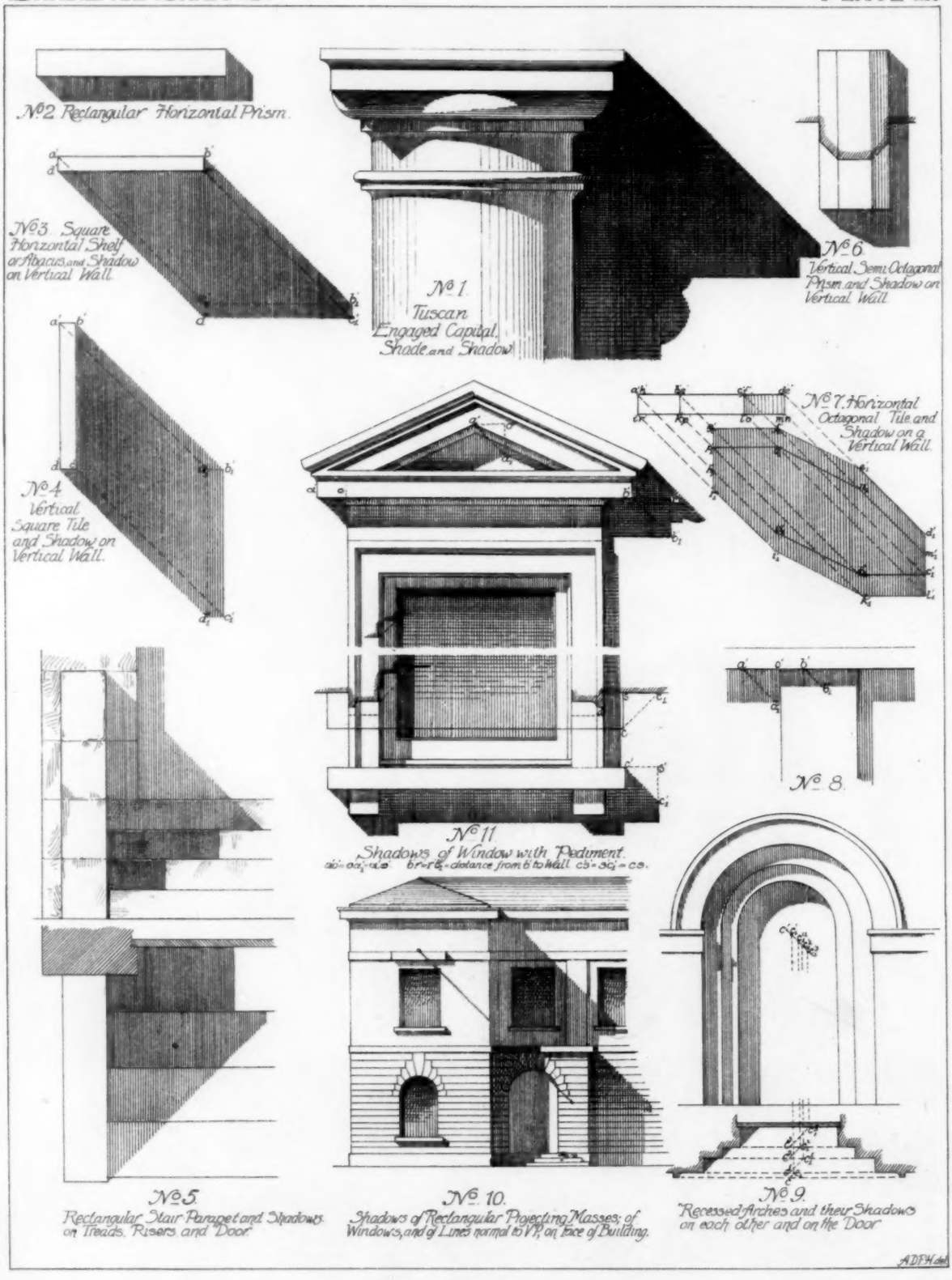
SHADES AND SHADOWS. PLATE 2.


№2 Rectangular Horizontal Prism.
№3 Square Horizontal Shelf or Abacus and Shadow on Vertical Wall.
№1 Tuscan Engaged Capital, Shade and Shadow.
№6 Vertical Semi Octagonal Prism and Shadow on Vertical Wall.
№4 Vertical Square Tile and Shadow on Vertical Wall.
№7 Horizontal Octagonal Tile and Shadow on a Vertical Wall.
№8.
№11 Shadows of Window with Pediment.
№5 Rectangular Stair Parapet and Shadows on Treads, Risers and Door.
№10 Shadows of Rectangular Projecting Masses; of Windows, and of Lines normal to VP, on Face of Building.
№9 Recessed Arches and their Shadows on each other and on the Door.
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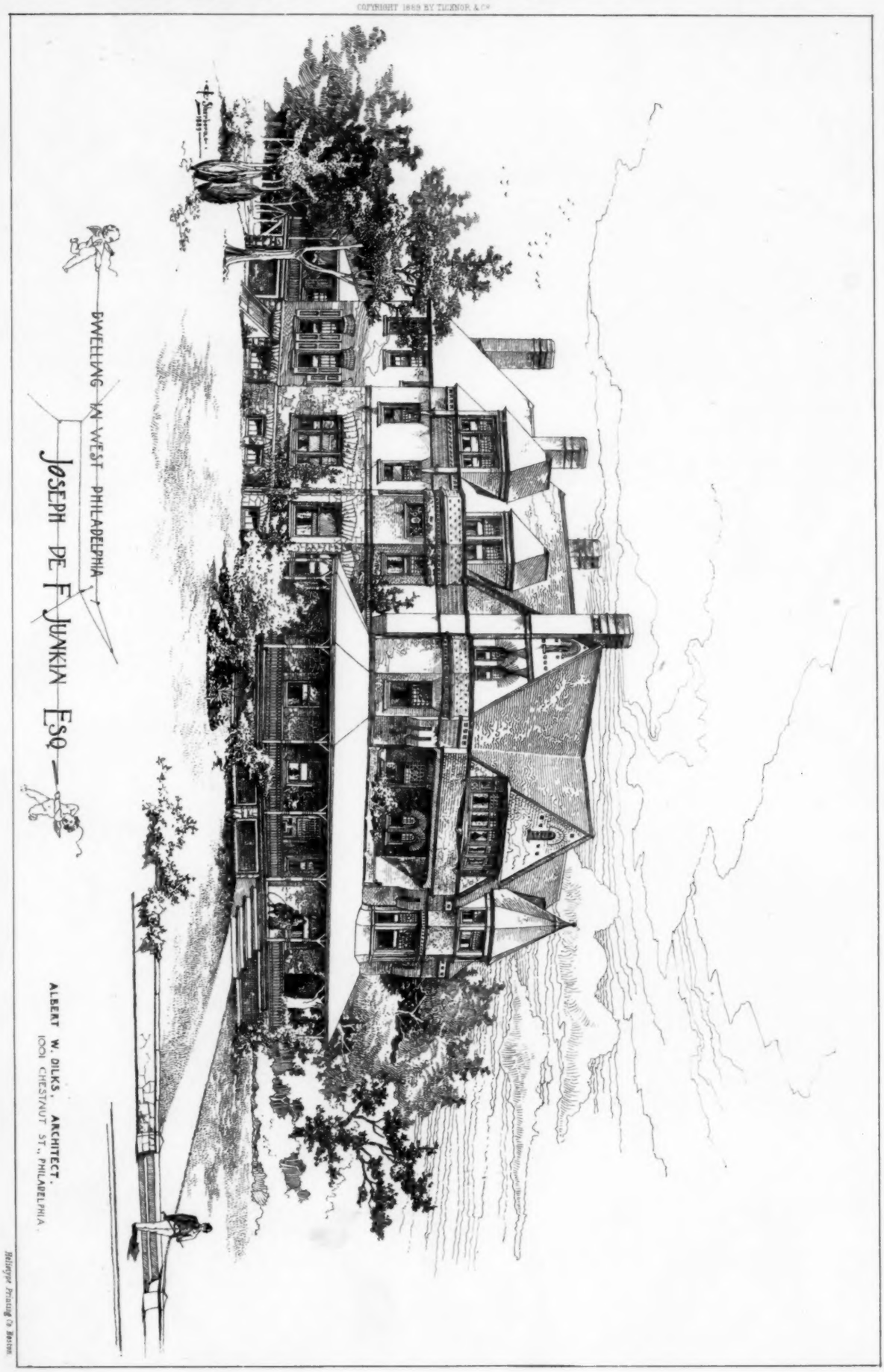

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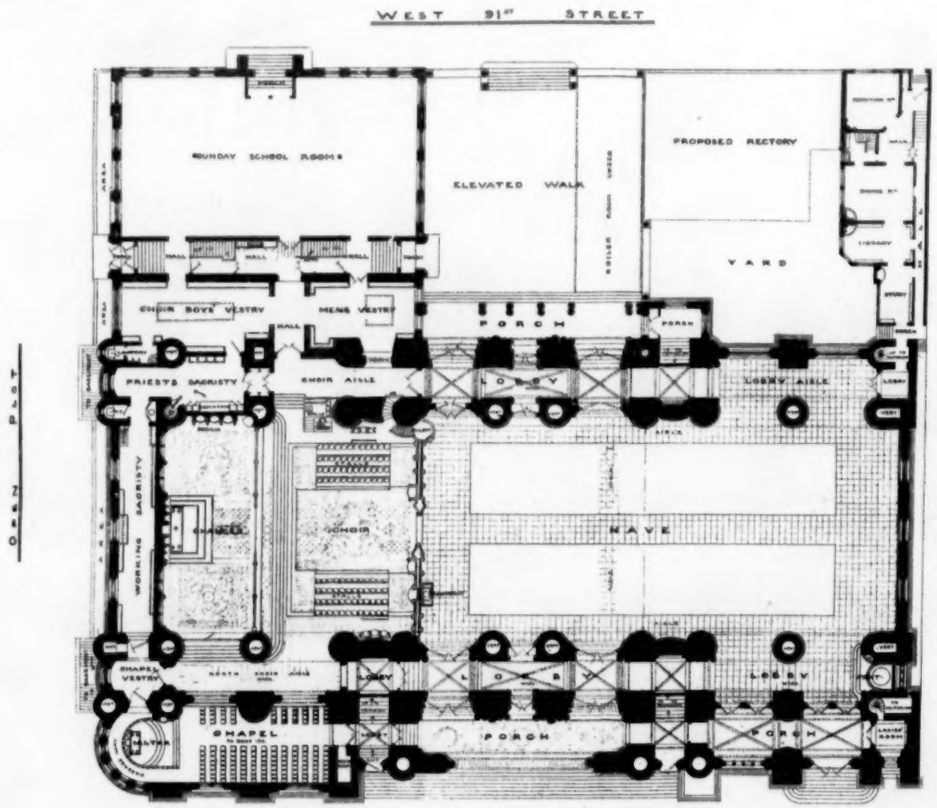

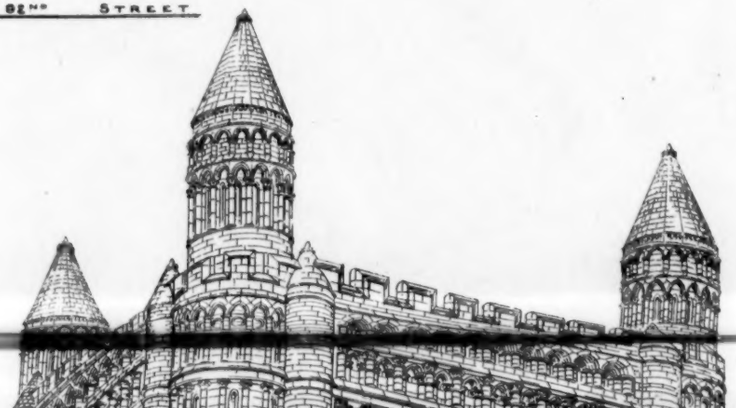

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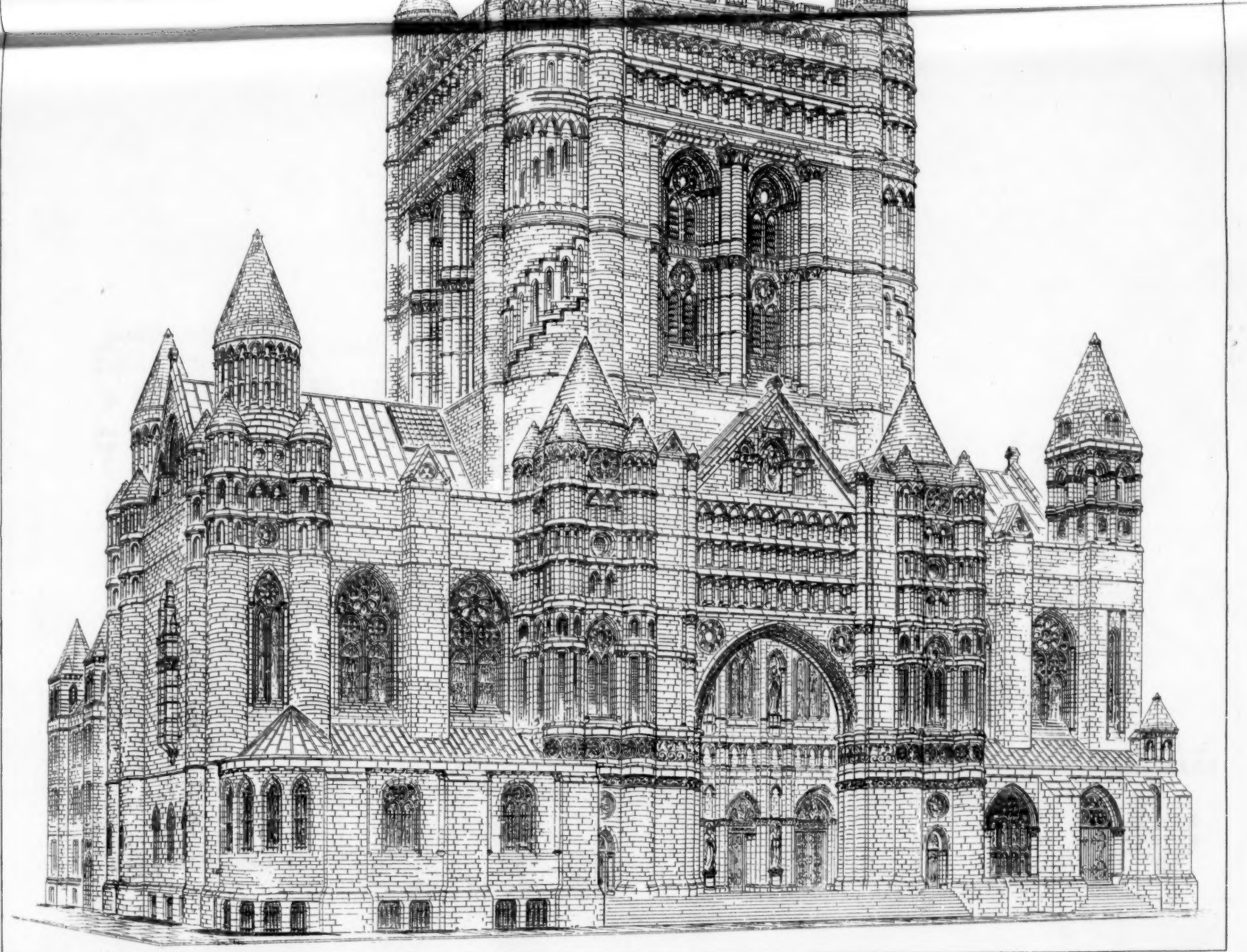

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